HAFLEY Dan

From: Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil>
Sent: Thursday, February 07, 2019 1:38 PM
To: HAFLEY Dan
Cc: Lantagne, Christopher E Col USAF 142 MSG (USA)
Subject: INFO: Portland ANG Base Public and Media Contact for PFAS
Signed By: roger.c.rein.civ@mail.mil

Dan,
The correct media and public point of contact for PFAS is our base Public Affairs Duty Officer (503-335-4351).

Roger Rein
142d FW/Environmental Manager
6801 NE Cornfoot Rd.
Portland, OR 97218-2797
503-335-4462 (office)
503-335-4953 (fax)
971-404-7698 (gov't cell)
971-227-6638 (personal cell)
503-292-7687 (home)
Sharepoint Site: https://intelshare.intelink.gov/sites/vemo/portland/
Public Website: http://www.142fw.ang.af.mil

From: HAFLEY Dan <Dan.HAFLEY@state.or.us>
Sent: Wednesday, February 6, 2019 8:15 AM
To: Lantagne, Christopher E Col USAF 142 MSG (USA) <christopher.e.lantagne.mil@mail.mil>; Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil>
Subject: [Non-DoD Source] RE: DEQ Interview with OPB

Roger –

The interview follows up on a previous information request from OPB which was wide-ranging from a PFAS standpoint. Our latest understanding is that Tony Schick at OPB is interested in discussing investigation work complete to date at PANGB, but also wants information on broader efforts by DEQ to address the rapidly-evolving PFAS issues o multi-program basis. If asked, I will share the results of the SI investigation and discuss plans for upcoming work.

Kevin Masterson, our Toxics Reduction Coordinator, will be joining me on the call to discuss DEQ's larger efforts. Someone from our Outreach staff will also be participating. I expect that while the Base may be the focus o technical discussion, ANG and perhaps other sites will be discussed.

We will of course let you know how the discussion/interview goes. If OPB requests a contact person, should I ident you?

We have been contacted by Oregon Public Broadcasting about PFAS investigations at PANG, and are expecting to be interviewed later this week, some of which may end up in the media. The plan is response in a factual, concise manner to any questions.

dh

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comm

HAFLEY Dan

From: Diller, Kristi <Kristi.Diller@parsons.com>
Sent: Wednesday, January 23, 2019 10:00 AM
To: HAFLEY Dan
Cc: Higginbotham, Aubrey M Capt USAF NGB A4 (US); Mehraban, Toni; Crow, Winston Kim CIV USAF (US)
Subject: RE: expanded PFAS analysis

Dan,

The list of 24 PFAS compounds is the EPA draft target analyte list. The EPA workgroup is developing SW-846 analytical methods for quantifying those 24 PFAS analytes, as mentioned in this briefing: https://www.epa.gov/sites/production/files/2018-04/documents/pfas_methods_tech_brief_02apr18_revison.pdf. At this time, the EPA draft target analyte list does not include GenX.

Regards,
Kristi

Kristi Diller, PG
Principal Geologist
1776 Lincoln Street Suite 600 – Denver, CO 80203
kristi.diller@parsons.com – P: 303.764.8803 M: 303.253.1749
PARSONS – Envision More
www.parsons.com | LinkedIn | Twitter | Facebook

From: HAFLEY Dan <Dan.HAFLEY@state.or.us>
Sent: Wednesday, January 23, 2019 10:23 AM
To: Diller, Kristi <Kristi.Diller@parsons.com>
Cc: Higginbotham, Aubrey M Capt USAF NGB A4 (US) <aubrey.m.higginbotham.mil@mail.mil>; Mehraban, Toni <Toni.Mehraban@parsons.com>
Subject: RE: expanded PFAS analysis

Kristi –

Thank you! Any reason this list was chosen for expanded analysis? ANG nation-wide protocol, for example? We notice that the analyte list does not include GenX, per se.

dh

From: Diller, Kristi <Kristi.Diller@parsons.com>
Sent: Wednesday, January 23, 2019 9:14 AM
To: HAFLEY Dan <Dan.HAFLEY@state.or.us>
Cc: Higginbotham, Aubrey M Capt USAF NGB A4 (US) <aubrey.m.higginbotham.mil@mail.mil>; Mehraban, Toni <Toni.Mehraban@parsons.com>
Subject: RE: expanded PFAS analysis

Hello Dan,

The following list of 24 PFAS compounds has been identified for the Portland ANG Expanded Site Inspection sampling effort. These compounds are analyzed by EPA 537 Modified. Let us know if you have follow-up questions.

Regards,
Kristi

Analyte	Chemical Abstracts Service (CAS) Number
Perfluorobutanoic acid (PFBA)	375-22-4
Perfluoropentanoic acid (PFPeA)	2706-90-3
Perfluorohexanoic acid (PFHxA)	307-24-4
Perfluoroheptanoic acid (PFHpA)	375-85-9
Perfluorooctanoic acid (PFOA)	335-67-1
Perfluorononanoic acid (PFNA)	375-95-1
Perfluorodecanoic acid (PFDA)	335-76-2
Perfluoroundecanoic acid (PFUnA)	2058-94-8
Perfluorododecanoic acid (PFDoA)	307-55-1
Perfluorotridecanoic Acid (PFTriA)	72629-94-8
Perfluorotetradecanoic acid (PFTeA)	376-06-7
Perfluorobutanesulfonic acid (PFBS)	375-73-5
Perfluorohexanesulfonic acid (PFHxS)	355-46-4
Perfluoroheptanesulfonic Acid (PFHpS)	375-92-8
Perfluorodecanesulfonic acid (PFDS)	335-77-3
Perfluorooctanesulfonic acid (PFOS)	1763-23-1
Perfluorooctane Sulfonamide (FOSA)	754-91-6
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	2991-50-6
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	2355-31-9
1H,1H,2H,2H-perfluorooctane sulfonate (6:2 FTS)	27619-97-2
1H,1H,2H,2H-perfluorodecane sulfonate (8:2 FTS)	39108-34-4
1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	757124-72-4
Perflouro-1-nonanesulfonate (PFNS)	68259-12-1
Perflouro-1-pentanesulfonate (PFPeS)	2706-91-4

Kristi Diller, PG
Principal Geologist
1776 Lincoln Street Suite 600 – Denver, CO 80203
kristi.diller@parsons.com – P: 303.764.8803 M: 303.253.1749
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From: HAFLEY Dan <Dan.HAFLEY@state.or.us>
Sent: Wednesday, January 23, 2019 9:59 AM
To: Higginbotham, Aubrey M Capt USAF NGB A4 (US) <aubrey.m.higginbotham.mil@mail.mil>
Cc: Diller, Kristi <Kristi.Diller@parsons.com>
Subject: expanded PFAS analysis

dh

From: Lantagne, Christopher E Col USAF 142 MSG (USA) <christopher.e.lantagne.mil@mail.mil>
Sent: Tuesday, February 05, 2019 4:14 PM
To: Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil>; HAFLEY Dan <Dan.HAFLEY@state.or.us>
Subject: RE: DEQ Interview with OPB

Dan,
Is the OPB interview just on PANGB? Just curious if we are being singled out or if other locations of concern with this emerging contaminant will be included?

v/r

Christopher Lantagne, Colonel, USAF
Commander, 142d Mission Support Group
Portland Air National Guard Base
DSN 638-5000
W: (503) 335-5000
C: (503) 314-0637

From: Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil < Caution-mailto:roger.c.rein.civ@mail.mil > >
Sent: Tuesday, February 5, 2019 3:32 PM
To: HAFLEY Dan <Dan.HAFLEY@state.or.us < Caution-mailto:Dan.HAFLEY@state.or.us > >
Cc: Lantagne, Christopher E Col USAF 142 MSG (USA) <christopher.e.lantagne.mil@mail.mil < Caution-mailto:christopher.e.lantagne.mil@mail.mil > >; 'Bies, Jenn' <Jenn.Bies@portofportland.com < Caution-mailto:Jenn.Bies@portofportland.com > >
Subject: DEQ Interview with OPB

Dan,
Thanks for the notification. I want to be sure you have received the Final SI report that was issued last week.

Roger Rein
142d FW/Environmental Manager
6801 NE Cornfoot Rd.
Portland, OR 97218-2797
503-335-4462 (office)
503-335-4953 (fax)
971-404-7698 (gov't cell)
971-227-6638 (personal cell)
503-292-7687 (home)
Sharepoint Site: Caution-https://intelshare.intelink.gov/sites/vemo/portland/ < Caution-https://intelshare.intelink.gov/sites/vemo/portland/ >
Public Website: Caution-http://www.142fw.ang.af.mil < Caution-http://www.142fw.ang.af.mil/ >

From: HAFLEY Dan <Dan.HAFLEY@state.or.us < Caution-mailto:Dan.HAFLEY@state.or.us > >
Sent: Tuesday, February 5, 2019 3:29 PM
To: Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil < Caution-mailto:roger.c.rein.civ@mail.mil > >
Cc: Higginbotham, Aubrey M Capt USAF NGB A4 (US) <aubrey.m.higginbotham.mil@mail.mil < Caution-mailto:aubrey.m.higginbotham.mil@mail.mil > >
Subject: [Non-DoD Source] public information request

HAFLEY Dan

From: HAFLEY Dan
Sent: Thursday, September 06, 2018 12:31 PM
To: 'thomas.c.bagnell.civ@mail.mill'
Cc: ATKINS Patricia
Subject: Portland ANG - State Performance Report

Thomas –

Note that I just completed the state performance report function (DSMOA Portal) for the Portland Air National Guard Facility ("Portland IAP"). JEP objectives previously outlined by Fran for the 2016-2018 period included three "areas". We assigned a "partially met" criterion based on the following:

- CERCLA PA and SI investigation documents planned for "Contaminated Area, West of Building 270" were delayed to at least 2018-2020 due to funding.
- CERCLA SI field work to address "Potential AFFF PFC AOCs" was completed, but the Draft Final SI Report has not been received within the 7/16 – 6/18 time period.
- Sites 1-11 closure was completed as proposed.

Once all Oregon sites are completed, I assume that new DEQ POC Patricia Atkins will submit.

Please let me know if you have questions or comments. It would be helpful to receive an updated schedule for submission of the Draft Final SI Report for PFCs.

Daniel J. Hafley, RG
Senior Project Manager / Hydrogeologist
Northwest Region Cleanup Section
Oregon DEQ

DSMOA Joint Execution Plan

2016-2018 CA

Installation Tasks and State Activities with Notes

Installation: **PORTLAND IAP**
State: **Oregon**
DOD Component: **AIR FORCE**
Funding Source: **IR**

Last modified: **3 December 2015**
Status: **Component Approved**
JEP built by: **Frances Saunders**
State Activities by: **Gil Wistar**
Locked by: **Frances Saunders**

Joint Execution Plan

Site or FUDS Project	Task	SubTask	State Activity
Contaminated Area, West of Building 270 (CB013)	CERCLA - Preliminary Assessment (PA)	Draft-Final Report -- (7/16 - 6/18)	Conference Calls
			Review and Response
			Site Visit
	CERCLA - Site Inspection (SI)	Draft-Final Work Plan -- (7/16 - 6/18)	Conference Calls
			Meeting
			Review and Response
			Site Visit
		Draft-Final Report -- (7/16 - 6/18)	Review and Response
			Technical & Regulatory Review/No Action
		Meetings -- (7/16 - 6/18) [1]	Meeting
			Conference Calls
Potential AFFF PFC AOCs [2]	CERCLA - Site Inspection (SI)	Draft-Final Work Plan -- (7/16 - 6/18)	Conference Calls
			Review and Response
			Site Visit
		Draft Final SI Report -- (7/16 - 6/18)	Conference Calls
			Review and Response
			Technical & Regulatory Review/No Action
		Meetings -- (7/16 - 6/18) [3]	Meeting
Sites 1-11 Closure	CERCLA - Site/Project Close-Out	Close-out Documentation Report -- (7/16 - 6/17)	Conference Calls
			Review and Response
			Technical & Regulatory Review/No Action
		Meetings -- (7/16 - 6/17) [4]	Meeting

Years 3-6

Notes

1 Annual or as required

2 Multiple [illegible] may be added, depending on the results of [illegible] to be awarded around the end of FY16; the PA is pre-decisional; no regulatory input is [illegible] until the Draft Final SI WP and Report are issued; includes PFOS and PFOA [illegible]

3 If necessary to discuss regulatory comments on Draft Final SI Work Plan and/or Report

4 Annual or as required

JEP Contact Information

Edited JEP?	POC Type	Name	Telephone	E-Mail
✔	State POC	[illegible]		[illegible]
✔	Step 2 POC	Saunders, Frances	[illegible]	frances.d.saunders.civ@mail.mil

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comm

HAFLEY Dan

From: HAFLEY Dan <Dan.HAFLEY@state.or.us>
Sent: Thursday, April 05, 2018 8:14 AM
To: Arunachalam, Selvam; HAFLEY Dan; Saunders, Frances D CIV USAF NGB A4 (US)
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US); Jones, Stan; Wise, Douglas
Subject: RE: Portland ANG - Final Phase III Investigation Work Plan

Approved. Thank you!

From: Arunachalam, Selvam <SELVAM.ARUNACHALAM@leidos.com>
Sent: Thursday, April 05, 2018 6:23 AM
To: HAFLEY Dan <Dan.HAFLEY@state.or.us>; Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil>; Jones, Stan <Stan.Jones@portofportland.com>; Wise, Douglas <Douglas.Wise@portlandoregon.gov>
Subject: RE: Portland ANG - Final Phase III Investigation Work Plan

Dan,

Please see below for responses to the final comments.

Thanks

Selvam Arunachalam P.E.| Leidos
Project Manager | Environmental Restoration
phone: 571 830 5139
arunachalams@leidos.com | leidos.com/infrastructure

leidos

From: HAFLEY Dan [mailto:Dan.HAFLEY@state.or.us]
Sent: Monday, March 26, 2018 12:34 PM
To: Arunachalam, Selvam [US-US]; Saunders, Frances D CIV USAF NGB A4 (US)
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US); Jones, Stan; Wise, Douglas
Subject: EXTERNAL: Portland ANG - Final Phase III Investigation Work Plan

ANG Representatives –

Please proceed with development and submission of the *Final Portland Site Inspection Work Plan for Perfluorinated Compounds Phase III*. A few final comments for your consideration in developing the document and moving forward with work:

- DEQ remains concerns about the adequacy of the proposed piezometer array to be used for estimating shallow groundwater direction and subsequent monitoring well positioning. This concern is based on a long history of working at the site, and knowledge that locally, shallow groundwater flow is variable and strongly influenced by

drainage features. As noted in our previous comments and acknowledged in your response-to-comments, monitoring wells should be positioned at or immediately adjacent to release areas in the absence of definitive gradient information. At the Former Site 7 Burn Pit, we recommend installation of the wells *within* the former pit area if there is any question about groundwater gradient.

Response: Monitoring well MW-POR11-01 will be relocated to within the burn pit and will be collocated with POR11-SB1. This revision will be made in the Final Portland SI Work Plan.

- We recommend a short conferral between ANG representatives, DEQ, and the Port after piezometric data are received and before well locations are finalized.

Response: A teleconference will be scheduled once the piezometric data is available to finalize well locations. Please note this teleconference will be scheduled on short notice and a quick decision regarding final well locations will be requested to minimize field delays.

- DEQ's recollection is that during inspection of the New Fire Department Building, Guard staff pointed out a location where there had been a period of drippage from a AFFF line inside the building, and that collection of either a soil or groundwater sample (beneath the building slab) was discussed. We do not see this on Figure 6-1. Could you please clarify?

Response: POR02-SB1 and MW-POR02-01 were intended to evaluate the dripping noted from the AFFF line at the center bay. The permanent well will remain outside the building, however, POR02-SB1 will be relocated to the drip location within the building. This revision will be made in the Final Portland SI Work Plan.

DEQ would like two hard copies of the final work plan, with accompanying CDs, for our administrative files. Depending on their preference, electronic or hard copies of the document should also be submitted to the Port of Portland and City of Portland Water Bureau concurrently. An initial distribution of the report electronically is fine, but please be aware that our servers typically do not allow emails larger than 7 MB to pass.

Response: Hard Copies with accompanying CDs will be mailed to all parties.

I can be reached by email or phone if you have questions.

Respectfully,

Daniel J. Hafley, RG
Senior Project Manager / Hydrogeologist
Northwest Region Cleanup Section
Oregon DEQ

From: Arunachalam, Selvam <SELVAM.ARUNACHALAM@leidos.com>
Sent: Monday, March 26, 2018 6:21 AM
To: HAFLEY Dan <Dan.HAFLEY@state.or.us>; Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil>; Jones, Stan <Stan.Jones@portofportland.com>
Subject: RE: Portland ANG

Dan,

Thanks for the heads up.
We are awaiting DEQ concurrence on the RTCs to issue the final work plan.

Thanks

Selvam Arunachalam P.E.| Leidos
Project Manager | Environmental Restoration
phone: 571 830 5139
arunachalams@leidos.com | leidos.com/infrastructure

leidos

From: HAFLEY Dan [mailto:Dan.HAFLEY@state.or.us]
Sent: Sunday, March 25, 2018 2:42 PM
To: Arunachalam, Selvam [US-US]; Saunders, Frances D CIV USAF NGB A4 (US)
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US); Jones, Stan
Subject: EXTERNAL: RE: Portland ANG

Selvam and Fran –

Is it safe to assume that you are waiting for DEQ (and Port) approval of the response-to-comments to proceed with preparation of the final document? Sorry, we are rather busy here at the moment. I am in the process of giving the response a final look and should be able to respond this coming week.

Daniel J. Hafley, RG
Senior Project Manager / Hydrogeologist
Northwest Region Cleanup Section
Oregon DEQ

DEQ
State of Oregon Department of Environmental Quality

Jeff J. Hafley, RG
Senior Project Manager / Hydrogeologist
Northwest Region Cleanup Section
Oregon DEQ

installation
results from deeper
vertical delineation.

may have on this phase of work. Please let me know if

viou resp

From: Arunachalam, Selvam <SELVAM.ARUNACHALAM@leidos.com>
Sent: Tuesday, March 13, 2018 11:13 AM
To: HAFLEY Dan <Dan.HAFLEY@state.or.us>
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil>; Jones, Stan <Stan.Jones@portofportland.com>; Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Subject: RE: Portland ANG
Importance: High

Dan,

Attached are the responses to DEQ and Port comments on the Draft SI Work Plan.
Also, included are the updated figures showing the stormwater flow direction and additional proposed temporary piezometer and well locations.
Please let me know if you have questions.

Thanks

Selvam Arunachalam P.E.| Leidos
Sr. Environmental Engineer | Environmental Restoration
phone: 571 830 5139
arunachalams@leidos.com | leidos.com/infrastructure

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From: HAFLEY Dan [mailto:Dan.HAFLEY@state.or.us]
Sent: Friday, February 16, 2018 5:22 PM
To: Saunders, Frances D CIV USAF NGB A4 (US)
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US); Jones, Stan; Arunachalam, Selvam [US-US]
Subject: EXTERNAL: Portland ANG
Importance: High

Fran –

Attached are DEQ comments on the (Draft Final) Phase III Investigation Work Plan for PFAS investigation at the Portland ANG facility. Note that I will be out of the office February 22 through March 7.

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HAFLEY Dan

From: HAFLEY Dan
Sent: Monday, March 26, 2018 9:34 AM
To: 'Arunachalam, Selvam'; Saunders, Frances D CIV USAF NGB A4 (US)
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US); Jones, Stan; 'Wise, Douglas'
Subject: Portland ANG - Final Phase III Investigation Work Plan

ANG Representatives –

Please proceed with development and submission of the *Final Portland Site Inspection Work Plan for Perfluorinated Compounds Phase III*. A few final comments for your consideration in developing the document and moving forward with work:

- DEQ remains concerns about the adequacy of the proposed piezometer array to be used for estimating shallow groundwater direction and subsequent monitoring well positioning. This concern is based on a long history of working at the site, and knowledge that locally, shallow groundwater flow is variable and strongly influenced by drainage features. As noted in our previous comments and acknowledged in your response-to-comments, monitoring wells should be positioned at or immediately adjacent to release areas in the absence of definitive gradient information. At the Former Site 7 Burn Pit, we recommend installation of the wells *within* the former pit area if there is any question about groundwater gradient.
- We recommend a short conferral between ANG representatives, DEQ, and the Port after piezometric data are received and before well locations are finalized.
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DEQ would like two hard copies of the final work plan, with accompanying CDs, for our administrative files. Depending on their preference, electronic or hard copies of the document should also be submitted to the Port of Portland and City of Portland Water Bureau concurrently. An initial distribution of the report electronically is fine, but please be aware that our servers typically do not allow emails larger than 7 MB to pass.

I can be reached by email or phone if you have questions.

Respectfully,

Daniel J. Hafley, RG
Senior Project Manager / Hydrogeologist
Northwest Region Cleanup Section
Oregon DEQ

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HAFLEY Dan

From: Arunachalam, Selvam <SELVAM.ARUNACHALAM@leidos.com>
Sent: Tuesday, March 13, 2018 11:13 AM
To: HAFLEY Dan
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US); Jones, Stan; Saunders, Frances D CIV USAF NGB A4 (US)
Subject: RE: Portland ANG
Importance: High

Dan,

Attached are the responses to DEQ and Port comments on the Draft SI Work Plan.
Also, included are the updated figures showing the stormwater flow direction and additional proposed temporary piezometer and well locations.
Please let me know if you have questions.

Thanks

Selvam Arunachalam P.E.| Leidos
Sr. Environmental Engineer | Environmental Restoration
phone: 571 830 5139
arunachalams@leidos.com | leidos.com/infrastructure

leidos

From: HAFLEY Dan [mailto:Dan.HAFLEY@state.or.us]
Sent: Friday, February 16, 2018 5:22 PM
To: Saunders, Frances D CIV USAF NGB A4 (US)
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US); Jones, Stan; Arunachalam, Selvam [US-US]
Subject: EXTERNAL: Portland ANG
Importance: High

Fran –

Attached are DEQ comments on the (Draft Final) Phase III Investigation Work Plan for PFAS investigation at the Portland ANG facility. Note that I will be out of the office February 22 through March 7.

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Conway

the

PRL

Oregon

Kate Brown, Governor

Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5263
FAX (503) 229-6945
TTY 711

February 16, 2018 *via electronic delivery*

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157

RE: DEQ Comments on Phase III PFAS Work Plan
Portland Air National Guard
ECSI# 1372

Fran:

Oregon DEQ staff completed review of the ***Work Plan for Fiscal Year 2017 Phase III, Regional Site Inspection for Perfluorooctanesulfonate and Perfluorooctanoic Acid at Portland Air National Guard Base, Portland, Oregon.*** The work plan was prepared by Leidos for the Air National Guard, Restoration Branch and dated January 2018.

Proposed investigation in the document includes multi-media sampling for perfluorinated alkylated substances (PFAS) including the compounds PFOS and PFOA. Our comments are presented below.

GENERAL

Port of Portland Comments. We are in agreement with the substance of Port comments on the Work Plan (Apex; February 15, 2018). Please consider/address in revising the submitted document.

Groundwater Monitoring. We agree with the *general* concept for groundwater investigation and discussed during the joint 2017 site visit, and presented in the Work Plan. However, the following should be considered:

- If the purpose of groundwater contaminant sampling is to identify potential releases at individual PRLs, well installation should occur at or in close proximity to the (surmised) release point to the degree possible. Previous investigation at PANG has shown that groundwater flow direction in the water table aquifer, the subject of proposed site investigation, can be highly variable and is strongly influenced by drainage features that bisect the site, and potentially by shallow subsurface utilities. Neither are discussed in the work plan. For example, groundwater flow direction at PRL 11 is likely influenced by nearby McBride Slough, resulting in the likelihood that sampling location MW-POR11-01 is upgradient of the former Site 7 burn pit. At this location, we recommend installation of the monitoring well within the former burn pit feature unless groundwater flow direction is confirmed *prior to* or in conjunction with Phase III work. If the purpose of the groundwater monitoring is to identify contaminant conditions at the PANG *perimeter*, the locations perhaps have more merit. DEQ prefers collection of groundwater samples at or near source locations, in this phase of work, as a general investigation approach. Please consider.

- Similarly, the purpose of piezometer installation and monitoring work is unclear. The array as proposed is unlikely to provide useful information on groundwater gradient in the investigation area given the expected variability in groundwater flow directions at the site (see above). This has been confirmed through a long history of groundwater site investigation at PANG. The uncertainties associated with groundwater flow direction should be clearly "spelled out" out in the work plan, and consideration given to increasing the number of piezometer locations. Also, we recommend that you include a figure or figures in the plan that show groundwater flow direction as determined by previous investigation work.

SPECIFIC

Section 3.5. There are a series of man-made "drainage ditches" present within the confines of the PANG base which are inundated on a year-round basis which collect and route stormwater runoff (and shallowest groundwater) to on-site treatment ponds, and ultimately discharge to nearby Columbia Slough to the south. These features are non-navigable. There are expected to be some ecological organisms associated with these features, while Columbia Slough is an important habitat area and is used for recreational purposes. Please expand and clarify this discussion, and consider including a figure showing the drainage "path" from the base to the Slough.

Section 3.6. A more complete and nuanced discussion of conditions within the shallowest water-bearing zone (Overbank Deposits Aquifer) is recommended, including the results of historical water level measurements at the base and estimation of groundwater flow direction, the influence of ditches and shallow utilities on groundwater flow direction, the likelihood for groundwater-to-surface water migration, etc.

Section 5.1. DEQ would like to observe at least a portion of the field work, and requests advance notice as is proposed for the base EM. In the case of DEQ, one week of advance notice is acceptable.

Section 6.2.3. See previous comments regarding groundwater flow direction and the adequacy of the proposed piezometer "network." Also, please discuss *when* water level measurements will be collect relative to installation and sampling of new groundwater wells. We assume that an effort will be made to collection WL data from piezometers and wells during a single monitoring event to maximum the usefulness of the data. If not, please explain.

Section 6.2.4. See DEQ and Port comments regarding proposed sampling locations.

Section 6.2.6. Detection limits for analytical work are presented are presented in QAPP Worksheet #15a. We recommend including a short discussion of these in the main body of the report, in particular in reference to "Project Action Limits." Also, DEQ *recommends* analysis for a broader suite of PFAS compounds, along the lines of what was completed at nearby Portland International Airport.

Sections 7.2.1 and 7.2.2. Proposed construction details for piezometers are acceptable; please see comment above regarding *when* WL measurements will occur. Construction details are not provided for monitoring wells in terms of positioning relative to the water table, screen length and slot size, filter pack sizing, etc. Please provide and confirm that, as constructed, well and piezometers data can (and will be) used jointly in estimating groundwater flow direction, with the results to be presented in later reporting.

Section 7.5.2. As-built diagrams should also include information on screen length and positioning relative to the top of the water table.

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The most important of the comments above relates to positioning of, in particular, groundwater samples relative to known or suspected source/release areas. After you have considered DEQ and Port comments, it may be useful to convene a phone conference call to discuss before finalizing the Work Plan.

Please contact me at (503) 229-5417 or by email (hafley.dan@deq.state.or.us) if you have questions or comments about the information presented in this letter.

Respectfully,

Daniel Hafley, RG
Senior Project Manager/Hydrogeologist

Ec: Paul Seidel, DEQ
Roger Rein, ANG
Stan Jones, Port of Portland

Cc: ECSI# 1372

1372 ~~3[illegible]~~ COMM

APEX

February 15, 2018

Mr. Stan Jones
Port of Portland
7200 NE Airport Way
Portland, Oregon 97218

Re: Review Comments
Site Inspection Work Plan for PFOS and PFOA (Draft Final)
Portland Air National Guard
February 2018

Dear Mr. Jones:

At the request of the Port of Portland (Port), Apex reviewed the above-referenced report. In general, the work plan describes the procedures and strategies for sample collection to determine the presence or absence of Perfluorooctanesulfonate (PFOS) and Perfluorooctanoic Acid (PFOA) at ten potential release locations (PRLs) of Aqueous Film Forming Foam (AFFF) associated with the Air National Guard facility leasehold of the Portland International Airport property. The locations include 9 of 10 locations identified as PRLs in the 2015 *Perfluorinated Compounds Preliminary Assessment Site Visit Report, Portland Air National Guard, 142nd Fighter Wing, Portland, Oregon* (Preliminary Assessment), as well as the former Installation Restoration Program (ISP) Site 7 Burn Pit. The work plan describes sampling and analysis procedures for investigation of each of these locations. The following are comments for further consideration by the Port.

Comments

1. Section 1.0. The work plan indicates that "...Sampling will only be performed on ANG property." For all proposed investigation locations, the Port of Portland is the property owner. The proposed investigation locations are on the current Air National Guard leasehold, with the exception of the Hangar 375 and Burn Pit locations.
2. Section 1.1. The work plan indicates that the site investigation will be conducted in part to "...provide a defensible no further action (NFA) decision." It is unclear which regulatory criteria the Air National Guard will be using to obtain a NFA.
3. Section 1.2. The work plan indicates that samples collected during the proposed investigation activities will be analyzed for the six UCMR3 chemicals by EPA method 537 revision 1.1. The Air National Guard could consider expanding this list to include other AFFF compounds that may be present on-site.
4. Section 2.3. This section indicates that "...investigation at the POL Storage – Building 431 would be replaced with investigation at the former Installation Restoration Program (IRP) Site 7." Table 2-1 should be updated to reflect this change and to provide an overview of Site 7.
5. Section 2.1. The work plan references the Portland Port Authority (PPA) as the landowner. This should be revised to Port of Portland (Port).
6. Section 3.5. While the Columbia River is located to the north of the facility, the facility surface water drainage path is to the Columbia Slough. The Columbia Slough primarily drains to the Willamette River.
7. Section 3.6. The discussion regarding inferred groundwater flow direction should be updated to document that groundwater flow is locally controlled by ditches, swales, and utilities on and near the Site.

8. Section 6.2.3. Only three temporary piezometers are proposed to evaluate the unknown groundwater flow direction. Three piezometers are insufficient given the shallow depth to groundwater, variability of groundwater flow, the size of the Site, and the nearby surface water features (i.e. drainage ditches and slough). Additionally, one of the proposed piezometer locations is within a depression, which may skew the evaluation of groundwater flow direction. Installation of additional piezometers for evaluation of groundwater flow direction should be considered.

9. Section 6.2.4. The proposed sediment samples should be composite samples collected over the area and depth to account for deposition, with the exception of the pond samples that will be collected above and below the liner. Additionally, groundwater sampling should be conducted at the source location. Downward vertical gradients may be strong and sampling only downgradient could miss a diving plume. Further, the assumption of certain areas as downgradient may be inaccurate; evaluation of groundwater flow direction will be required during the site investigation activities to confirm localized flow direction and gradient.

10. Section 6.0, Table 6-1.

    a. New Fire Department Building: One monitoring well is proposed for installation in the center of this building. One well may be insufficient, based on the grassy area outside the building which may have been used to clear vehicle lines. Additionally, soil samples should be collected from within the adjacent field.

    b. Old Fire Department Building: One monitoring well is proposed for installation downgradient from the building. One well may be insufficient, based on the two grassy areas to the east and west that may not be upgradient that should be considered. Additionally, soil samples should be collected from within the fields.

    c. Burn Pit: One monitoring well is proposed for installation in the presumed downgradient direction from the burn pit. Groundwater flow on the site can be locally controlled by drainage facilities such as ditches and swales. Based on the location of McBride Slough, the presumed groundwater flow may be locally inaccurate. As such, one monitoring well may be insufficient at this location. Additional groundwater samples should be collected within the former burn pit area, as well as in locations presumed downgradient and upgradient of the pit.

If you have any questions about these comments, please contact the undersigned at (503) 924-4704.

Sincerely,

Adam Reese, C.E.G.
Division Manager

1372
COMM

Responses to comments from Oregon Department of Environmental Quality

Draft Final Portland Site Inspection Work Plan (SI WP) for Perfluorinated Compounds (PFCs) Phase III
Portland Air National Guard Base, Portland, Oregon
January 2018

General Comments

Port of Portland Comments. We are in agreement with the substance of Port comments on the Work Plan (Apex; February 15, 2018). Please consider/address in revising the submitted document.

Groundwater Monitoring. We agree with the *general* concept for groundwater investigation and discussed during the joint 2017 site visit, and presented in the Work Plan. However, the following should be considered:

• If the purpose of groundwater contaminant sampling is to identify potential releases at individual PRLs, well installation should occur at or in close proximity to the (surmised) release point to the degree possible. Previous investigation at PANG has shown that groundwater flow direction in the water table aquifer, the subject of proposed site investigation, can be highly variable and is strongly influenced by drainage features that bisect the site, and potentially by shallow subsurface utilities. Neither are discussed in the work plan. For example, groundwater flow direction at PRL 11 is likely influenced by nearby McBride Slough, resulting in the likelihood that sampling location MW-POR11-01 is upgradient of the former Site 7 burn pit. At this location, we recommend installation of the monitoring well within the former burn pit feature unless groundwater flow direction is confirmed *prior to* or in conjunction with Phase III work. If the purpose of the groundwater monitoring is to identify contaminant conditions at the PANG *perimeter*, the locations perhaps have more merit. DEQ prefers collection of groundwater samples at or near source locations, in this phase of work, as a general investigation approach. Please consider.

Response: *The intent of the SI is to determine the presence or absence of PFOS/PFOA in various media at and/or downgradient of PRLs and evaluate the potential for off-Base migration using the guidance currently available. In general, the SI approach is to collect soil samples at the PRL and groundwater samples immediately downgradient of the PRL and at the Base boundary. The permanent monitoring wells will be placed as close to the PRL in the downgradient direction as feasible. Local groundwater flow direction will be confirmed using temporary piezometers prior to installing permanent groundwater wells in order to ensure groundwater sample locations are primarily placed downgradient of the PRLs and may result in adjusting the locations of the permanent monitoring wells. Temporary piezometers will be abandoned following water level measurement.*

• Similarly, the purpose of piezometer installation and monitoring work is unclear. The array as proposed is unlikely to provide useful information on groundwater gradient in the investigation area given the expected variability in groundwater flow directions at the site (see above). This has been confirmed through a long history of groundwater site investigation at PANG. The uncertainties associated with groundwater flow direction should be clearly "spelled out" out in the work plan, and consideration given to increasing the number of piezometer locations. Also, we recommend that you include a figure or figures in the plan that show groundwater flow direction as determined by previous investigation work.

Response: *To account for the effects of the drainage features and nearby surface water features on the groundwater flow direction, three additional piezometers will be installed. Two of the additional piezometers will be co-located with POR11-SB1 (within the burn pit area), and POR03-SB2. These temporary piezometers should account for influence from McBride Slough and provide groundwater flow*

COMM

Responses to comments from Oregon Department of Environmental Quality

Draft Final Portland Site Inspection Work Plan (SI WP) for Perfluorinated Compounds (PFCs) Phase III
Portland Air National Guard Base, Portland, Oregon
January 2018

General Comments

Port of Portland Comments. We are in agreement with the substance of Port comments on the Work Plan (Apex; February 15, 2018). Please consider/address in revising the submitted document.

Groundwater Monitoring. We agree with the *general* concept for groundwater investigation and discussed during the joint 2017 site visit, and presented in the Work Plan. However, the following should be considered:

• If the purpose of groundwater contaminant sampling is to identify potential releases at individual PRLs, well installation should occur at or in close proximity to the (surmised) release point to the degree possible. Previous investigation at PANG has shown that groundwater flow direction in the water table aquifer, the subject of proposed site investigation, can be highly variable and is strongly influenced by drainage features that bisect the site, and potentially by shallow subsurface utilities. Neither are discussed in the work plan. For example, groundwater flow direction at PRL 11 is likely influenced by nearby McBride Slough, resulting in the likelihood that sampling location MW-POR11-01 is upgradient of the former Site 7 burn pit. At this location, we recommend installation of the monitoring well within the former burn pit feature unless groundwater flow direction is confirmed *prior to* or in conjunction with Phase III work. If the purpose of the groundwater monitoring is to identify contaminant conditions at the PANG *perimeter*, the locations perhaps have more merit. DEQ prefers collection of groundwater samples at or near source locations, in this phase of work, as a general investigation approach. Please consider.

Response: *The intent of the SI is to determine the presence or absence of PFOS/PFOA in various media at and/or downgradient of PRLs and evaluate the potential for off-Base migration using the guidance currently available. In general, the SI approach is to collect soil samples at the PRL and groundwater samples immediately downgradient of the PRL and at the Base boundary. The permanent monitoring wells will be placed as close to the PRL in the downgradient direction as feasible. Local groundwater flow direction will be confirmed using temporary piezometers prior to installing permanent groundwater wells in order to ensure groundwater sample locations are primarily placed downgradient of the PRLs and may result in adjusting the locations of the permanent monitoring wells. Temporary piezometers will be abandoned following water level measurement.*

• Similarly, the purpose of piezometer installation and monitoring work is unclear. The array as proposed is unlikely to provide useful information on groundwater gradient in the investigation area given the expected variability in groundwater flow directions at the site (see above). This has been confirmed through a long history of groundwater site investigation at PANG. The uncertainties associated with groundwater flow direction should be clearly "spelled out" out in the work plan, and consideration given to increasing the number of piezometer locations. Also, we recommend that you include a figure or figures in the plan that show groundwater flow direction as determined by previous investigation work.

Response: *To account for the effects of the drainage features and nearby surface water features on the groundwater flow direction, three additional piezometers will be installed. Two of the additional piezometers will be co-located with POR11-SB1 (within the burn pit area), and POR03-SB2. These temporary piezometers should account for influence from McBride Slough and provide groundwater flow*

direction for the eastern portion of the Base. An additional temporary piezometer will also be co-located with MW-POR10-01 along the western Base boundary. The western temporary piezometer array should account for the drainage features bisecting the Base. The groundwater flow direction (north-northwest in the Overbank Deposits) provided on Figures 6-1 and 6-2 is based on previous investigation work as reported by the Preliminary Assessment. The uncertainties associated with groundwater flow direction will be expanded upon in the work plan as discussed in the response to Specific Comment #2 below.

Specific Comments

1. Section 3.5. There are a series of man-made "drainage ditches" present within the confines of the PANG base which are inundated on a year-round basis which collect and route stormwater runoff (and shallowest groundwater) to on-site treatment ponds, and ultimately discharge to nearby Columbia Slough to the south. These features are non-navigable. There are expected to be some ecological organisms associated with these features, while Columbia Slough is an important habitat area and is used for recreational purposes. Please expand and clarify this discussion, and consider including a figure showing the drainage "path" from the base to the Slough.

   Response: *The discussion surrounding the surface water flow path from the man-made drainage ditches to the Columbia Slough will be expanded as requested. The following text will be added to Section 3.5:*

   "There are natural and significant surface water bodies and both navigable and non-navigable waterways at and adjacent to Portland ANGB. Surface water flow from the Portland ANGB and the Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is a complex of narrow and shallow channels extending approximately 18 miles within the southern floodplain of the Columbia River. The Columbia River is the major surface water feature located to the north of Portland ANGB and PDX. The Columbia Slough receives water from springs to the northeast of the Portland International Airport, local groundwater seepage from shallow saturated zones, as well as local surface water runoff from Portland ANGB.

   Surface water flow at Portland ANGB is dictated by the Base's man-made surface drainage system. Stormwater is captured by drainage ditches throughout the property, which then directs the flow to two man-made stormwater Detention Ponds on the Portland ANGB. The drainage ditch footprint occupies approximately 1.8 acres and consists of two branches. The main branch is approximately 2,800 feet long, and the north branch extends approximately 1,700 feet. The two branches converge at the point of discharge to the detention ponds. The outfall from the upper detention pond can be closed allowing the pond to be used as a containment area. Stormwater is discharged from the upper pond to the lower pond, before it is conveyed to the Portland International Airport's detention pond, and then to the Columbia Slough."

   The surface water drainage pathway from the base to the Columbia Slough will be added to Figure 1-1.

2. Section 3.6. A more complete and nuanced discussion of conditions within the shallowest water-bearing zone (Overbank Deposits Aquifer) is recommended, including the results of historical water level measurements at the base and estimation of groundwater flow direction, the influence of ditches and shallow utilities on groundwater flow direction, the likelihood for groundwater-to-surface water migration, etc.

Response: *A brief discussion of the Project Action Limits values is provided in Section 1.2 of the work plan.*

The SI scope only includes the analysis of the six PFAS compounds in the UCMR3 list. The selection of the six chemicals of concern are in response with the current life time health advisory that was established by the EPA and constituents identified in the Material Safety Data Sheet for the AFFF. If the SI confirms the presence of PFOS/PFOA, the ANG intends on moving into the remedial investigation (RI) phase. Without a clear clean up standard for PFOS/PFOA and the challenges the ANG is facing addressing PFOS/PFOA concerns across the ANG enterprise, any further investigation will be prioritized with all other remedial work that needs to be conducted across the Air Force in order to protect human health.

7. Sections 7.2.1 and 7.2.2. Proposed construction details for piezometers are acceptable; please see comment above regarding *when* WL measurements will occur. Construction details are not provided for monitoring wells in terms of positioning relative to the water table, screen length and slot size, filter pack sizing, etc. Please provide and confirm that, as constructed, well and piezometers data can (and will be) used jointly in estimating groundwater flow direction, with the results to be presented in later reporting.

Response: *Section 7.2.2 contains relative monitoring well construction details, however the requested information will be included in the work plan (Section 7.2.2). See response to Specific Comment #4 for information related to water level measurements. The water level measurements will be used in estimating groundwater flow direction, and the results will be presented in the SI Report.*

8. Section 7.5.2. As-built diagrams should also include information on screen length and positioning relative to the top of the water table.

Response: *The as-built well diagrams will include the requested information.*

Responses to comments from Port of Portland
February 2018

1. Section 1.0. The work plan indicates that "…Sampling will only be performed on ANG property." For all proposed investigation locations, the Port of Portland is the property owner. The proposed investigation locations are on the current Air National Guard leasehold, with the exception of the Hangar 375 and Burn Pit locations.

   Response: *The text in Section 1 will be clarified to indicate that the Air National Guard leases the current property (except Hangar 375) on which the investigation will be conducted.*

2. Section 1.1. The work plan indicates that the site investigation will be conducted in part to "…provide a defensible no further action (NFA) decision." It is unclear which regulatory criteria the Air National Guard will be using to obtain a NFA.

   Response: *As described in Section 1.2 of the Work Plan, the EPA 2016 drinking water lifetime HA levels (PFOS and PFOA) and residential risk-based screening level for tap water (PFBS) for groundwater and surface water screening and the residential risk-based soil screening levels determined using the EPA RSL calculator and the most current EPA RSL tables for soil and sediment will be used as the project action limits. The comparison of collected data to these values will aid in determining whether additional investigation or NFA is required at Portland ANGB.*

3. Section 1.2. The work plan indicates that samples collected during the proposed investigation activities will be analyzed for the six UCMR3 chemicals by EPA method 537 revision 1.1. The Air National Guard could consider expanding this list to include other AFFF compounds that may be present on-site.

   Response: *The SI scope only includes the analysis of the six PFAS compounds in the UCMR3 list. The selection of the six chemicals of concern are in response with the current life time health advisory that was established by the EPA and constituents identified in the Material Safety Data Sheet for the AFFF. If the SI confirms the presence of PFOS/PFOA, the ANG intends on moving into the remedial investigation (RI) phase. Without a clear clean up standard for PFOS/PFOA and the challenges the ANG is facing addressing PFOS/PFOA concerns across the ANG enterprise, any further investigation will be prioritized with all other remedial work that needs to be conducted across the Air Force in order to protect human health.*

4. Section 2.3. This section indicates that "…investigation at the POL Storage – Building 431 would be replaced with investigation at the former Installation Restoration Program (IRP) Site 7." Table 2-1 should be updated to reflect this change and to provide an overview of Site 7.

   Response: *The intent of Table 2-1 is to provide the conclusions from the PA. No change recommended.*

5. Section 2.1. The work plan references the Portland Port Authority (PPA) as the landowner. This should be revised to Port of Portland (Port).

   Response: *The text will be revised as suggested.*

6. Section 3.5. While the Columbia River is located to the north of the facility, the facility surface water drainage path is to the Columbia Slough. The Columbia Slough primarily drains to the Willamette River.

Response: *See response to DEQ Specific Comment #1.*

7. Section 3.6. The discussion regarding inferred groundwater flow direction should be updated to document that groundwater flow is locally controlled by ditches, swales, and utilities on and near the Site.

Response: *See response to DEQ Specific Comment #1.*

8. Section 6.2.3. Only three temporary piezometers are proposed to evaluate the unknown groundwater flow direction. Three piezometers are insufficient given the shallow depth to groundwater, variability of groundwater flow, the size of the Site, and the nearby surface water features (i.e. drainage ditches and slough). Additionally, one of the proposed piezometer locations is within a depression, which may skew the evaluation of groundwater flow direction. Installation of additional piezometers for evaluation of groundwater flow direction should be considered.

Response: *See response to the second DEQ General Comment.*

9. Section 6.2.4. The proposed sediment samples should be composite samples collected over the area and depth to account for deposition, with the exception of the pond samples that will be collected above and below the liner. Additionally, groundwater sampling should be conducted at the source location. Downward vertical gradients may be strong and sampling only downgradient could miss a diving plume. Further, the assumption of certain areas as downgradient may be inaccurate; evaluation of groundwater flow direction will be required during the site investigation activities to confirm localized flow direction and gradient.

Response: *The work plan will be revised to indicate that composite sediment samples will be collected from the swale at PRL 5 and from the northern and southern ponds at PRL 10. The depth/volume of water and resulting accessibility of sediment at PRL 10 will be taken into account to ensure the safety of the field staff conducting the sampling. The sediment sample from the catch basin adjacent to Hangar 380 will remain a discrete sediment sample.*

In general, groundwater samples will be collected downgradient of the PRL based on the groundwater flow direction, however, in some instances, groundwater samples are recommended at the PRL based on site features or history of AFFF use. Because PFOS/PFOA tends to migrate rapidly and has the potential to travel long distances, collection of a groundwater sample downgradient from the PRL will adequately support the SI objective.

10. Section 6.0, Table 6-1.

    a. New Fire Department Building: One monitoring well is proposed for installation in the center of this building. One well may be insufficient, based on the grassy area outside the building which may have been used to clear vehicle lines. Additionally, soil samples should be collected from within the adjacent field.

    Response: *The soil sample locations were chosen based on historical site activities. The southern sample locations (soil and groundwater) are intended to evaluate potential AFFF releases from the central bay. The northern sample is proposed because according to the Annual Storm Water Reports provided in the PA, three instances of AFFF were discharged to the stormwater sewer system via the stormwater drain and catch basin located north of the*

Response: *The discussion related to the shallowest water bearing zone and groundwater flow direction will be expanded as requested. The estimated groundwater flow direction is provided in Section 3.6 as "predominantly toward the west and northwest." The following text will be added to Section 3.6:*

"According to the 2006 EBS, the shallowest water bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9.0 feet (ft) below ground surface (bgs) and which ranges in thickness from 3 to 19 ft. The discontinuous lenses of the Upper Zone are in scattered locations throughout the northern, eastern, and southwestern portions of the Portland ANGB.

Groundwater flow direction varies between water bearing units and tends to fluctuate seasonally and in response to changes in the Columbia River stage caused by releases from Bonneville Dam. In the shallow aquifer, groundwater dominantly flows towards the west and northwest, although the flow direction varies considerably locally. Water levels in the shallow zone are influenced by recharge/discharge through drainage ditches throughout the subject property and the Columbia Slough to the south, although the hydraulic connection between the Slough and the shallow aquifer may be muted by low-permeability sediments in the bed of the Slough."

3. Section 5.1. DEQ would like to observe at least a portion of the field work, and requests advance notice as is proposed for the base EM. In the case of DEQ, one week of advance notice is acceptable.

   Response: *Comment noted. DEQ will be provided with advance notification of the field work.*

4. Section 6.2.3. See previous comments regarding groundwater flow direction and the adequacy of the proposed piezometer "network." Also, please discuss *when* water level measurements will be collect relative to installation and sampling of new groundwater wells. We assume that an effort will be made to collection WL data from piezometers and wells during a single monitoring event to maximum the usefulness of the data. If not, please explain.

   Response: *See response to the second General Comment. Water level measurements will be collected from the temporary piezometers to determine local groundwater flow direction prior to installation of the permanent monitoring wells. The temporary piezometers will be abandoned following water level measurements. The permanent monitoring wells will be placed immediately downgradient of the PRLs based on the temporary piezometer water levels and historic water level data. The water levels will be collected from the piezometers and monitoring wells during a single mobilization. This information will be appended to Section 6.2.3 of the Work Plan.*

5. Section 6.2.4. See DEQ and Port comments regarding proposed sampling locations.

   Response: *Comments regarding proposed sample locations are addressed in the Responses to Port of Portland comments provided following responses to DEQ comments.*

6. Section 6.2.6. Detection limits for analytical work are presented are presented in QAPP Worksheet #15a. We recommend including a short discussion of these in the main body of the report, in particular in reference to "Project Action Limits." Also, DEQ *recommends* analysis for a broader suite of PFAS compounds, along the lines of what was completed at nearby Portland International Airport.

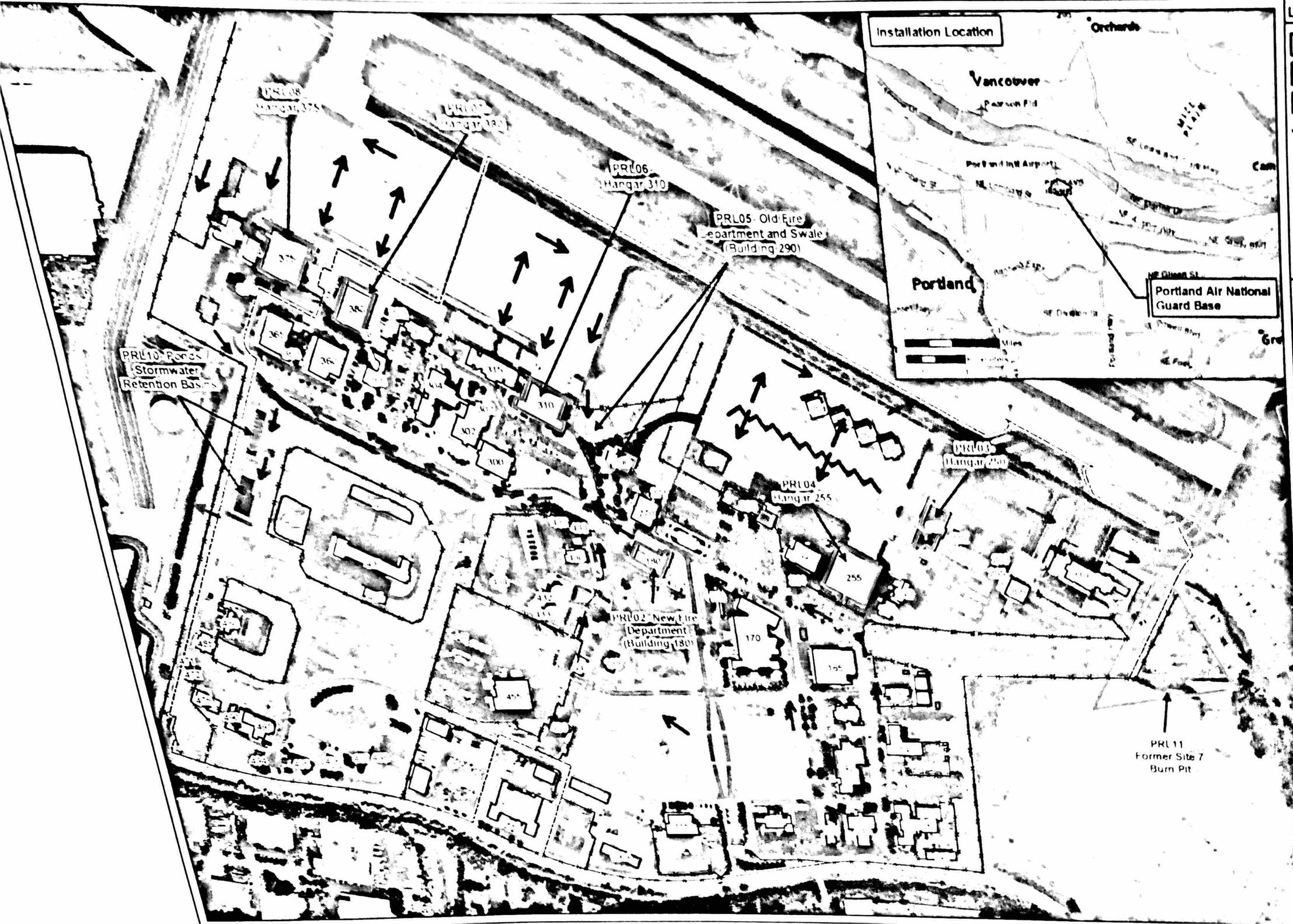
building. The field east of the building is assumed to be upgradient of the PRL, therefore, the groundwater monitoring well proposed for the PRL would adequately evaluate any potential releases in the adjacent field. A new monitoring well will be added to the downgradient, grassy area west of the building to provide additional coverage of the PRL.

b. Old Fire Department Building: One monitoring well is proposed for installation downgradient from the building. One well may be insufficient, based on the two grassy areas to the east and west that may not be upgradient that should be considered. Additionally, soil samples should be collected from within the fields.

Response: *Permanent monitoring well locations may be adjusted once the groundwater flow direction is determined from the temporary piezometers to ensure the monitoring well is placed downgradient of the site. Soil sample locations proposed in the work plan were determined based on known or suspected storage areas or releases of AFFF. A soil sample is proposed to be collected west of the Old Fire Department building and from the swale where a release of AFFF is known to have occurred. If PFOS/PFOA is determined to be present during the SI sampling, additional samples may be taken to determine extent of contamination during a future investigation.*

c. Burn Pit: One monitoring well is proposed for installation in the presumed downgradient direction from the burn pit. Groundwater flow on the site can be locally controlled by drainage facilities such as ditches and swales. Based on the location of McBride Slough, the presumed groundwater flow may be locally inaccurate. As such, one monitoring well may be insufficient at this location. Additional groundwater samples should be collected within the former burn pit area, as well as in locations presumed downgradient and upgradient of the pit.

Response: *Permanent monitoring well locations may be adjusted once the groundwater flow direction is determined from the temporary piezometers to ensure the monitoring well is placed downgradient of the site. Because PFOS/PFOA tends to migrate rapidly and has the potential to travel long distances, collection of a groundwater sample downgradient from the PRL will adequately support the SI objective.*



LEGEND:

- Potential Release Location (PR
- Installation Boundary*
- Building*
- Fence*
- Storm Water Flow

NOTES:

* Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 07/26/2017

1 Storm water flow path based on 2000 Environmental Baseline Survey

2 Background Source: ESRI World Imagery (DigitalGlobe, 07/2016).

0 150 300 600 Feet

0 75 150 300 Meters

WASHINGTON

OREGON

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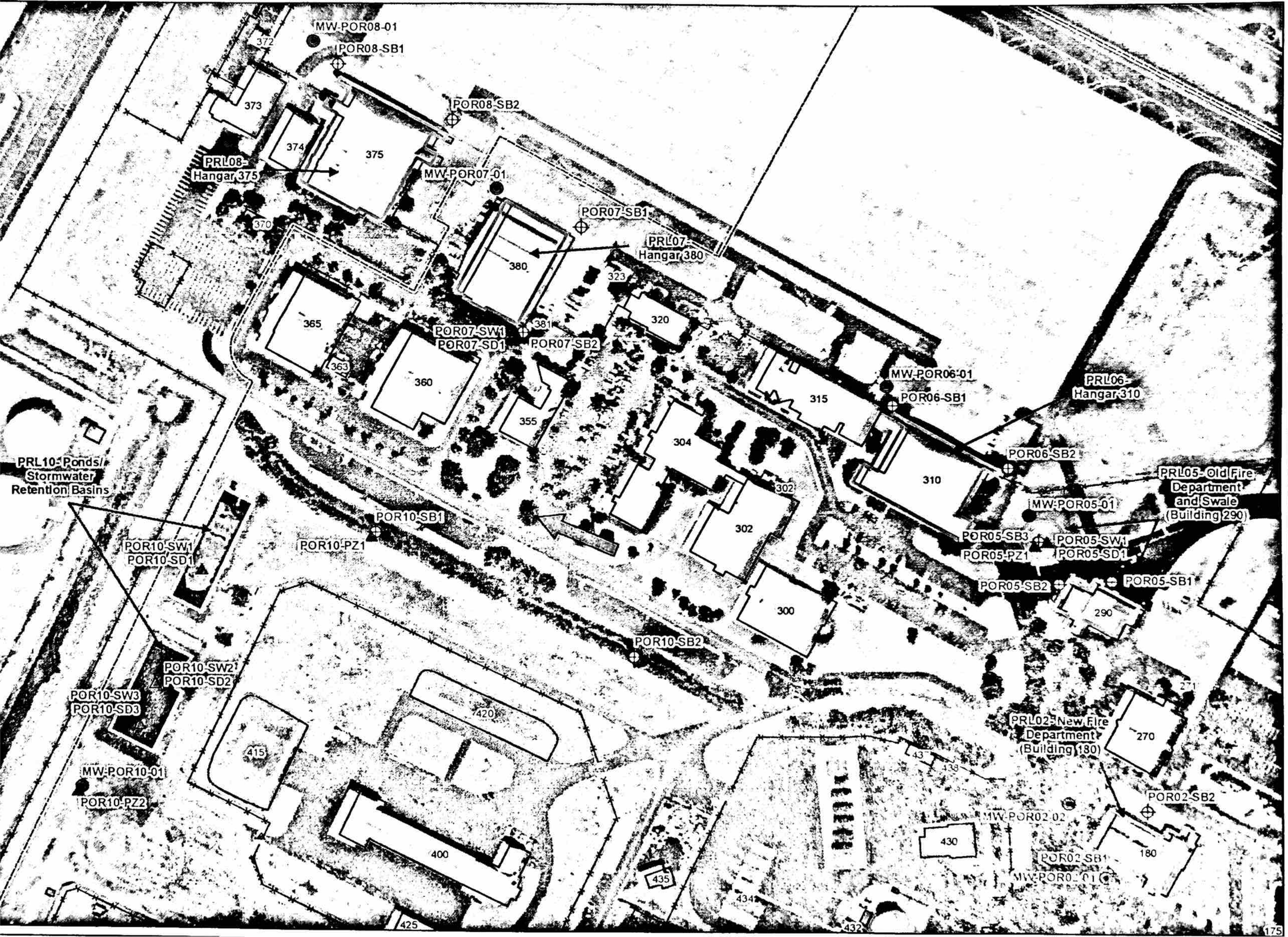
PORTLAND
AIR NATIONAL GUARD BASE
PORTLAND, OREGON

LOCATIONS OF PRLs AT PORTLAND
AIR NATIONAL GUARD BASE
142ND FIGHTER WING



LEGEND:

- Proposed Soil Boring
- Proposed Monitoring Well
- Proposed Surface Water/Sediment Sample
- Proposed Temporary Piezometer
- Potential Release Location (PRL)
- Installation Boundary*
- Building*
- Fence*
- Inferred Regional Groundwater Flow

POR02-SB1 Location Identifier

NOTES:

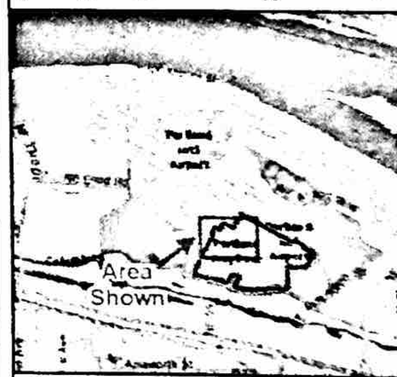
* Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 07/26/2017.

1. Background Source: ESRI World Imagery (DigitalGlobe, 07/2016).
2. Potential temporary piezometer locations may be adjusted based on field conditions.
3. Permanent monitoring well locations may be adjusted once the groundwater flow is determined from the installed temporary piezometers.

0 50 100 200 Feet

0 20 40 80 Meters

N



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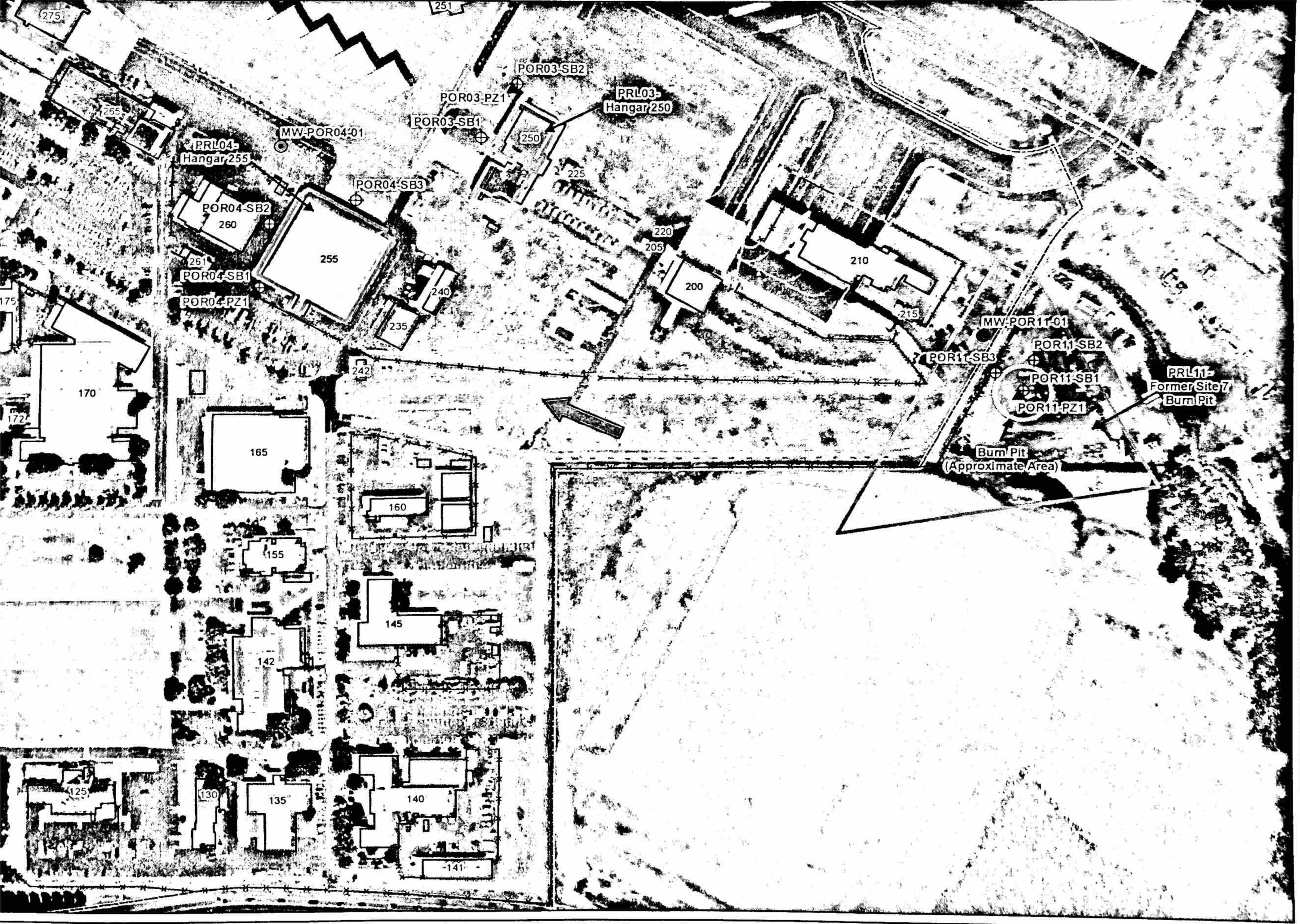
PORTLAND
AIR NATIONAL GUARD BASE
PORTLAND, OREGON

PROPOSED SAMPLE LOCATIONS AT
BUILDING 180, BUILDING 290, HANGA
310, HANGAR 380, HANGAR 375, AND
PONDS/STORMWATER RETENTION
BASINS (PRL 02, 05, 06, 07, 08, AND 1



LEGEND:

- Proposed Soil Boring
- Proposed Monitoring Well
- Proposed Temporary Piezomet
- Potential Release Location (PR
- Site Feature
- Installation Boundary*
- Building*
- Fence*
- Inferred Regional Groundwater Flow

POR03-SB1 Location Identifier

NOTES:

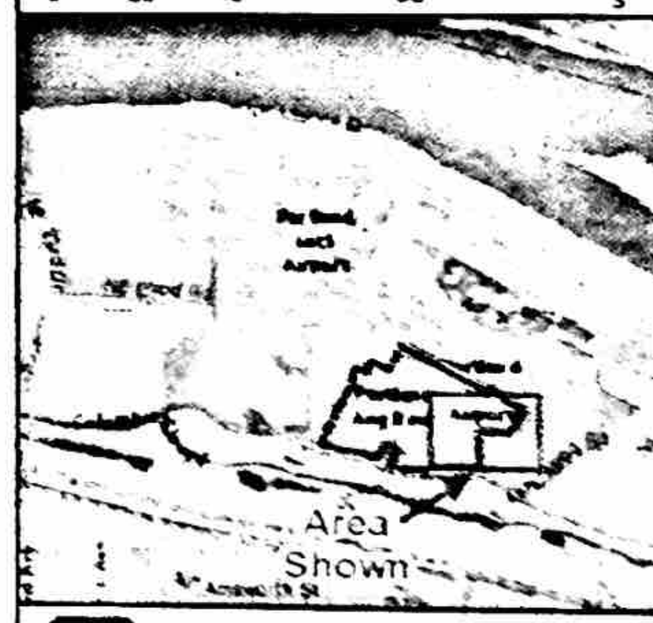
* Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 07/26/2017.

1. Background Source: ESRI World Imagery (DigitalGlobe, 07/2016).
2. Potential temporary piezometer locations may be adjusted based on field conditions.
3. Permanent monitoring well locations may be adjusted once the groundwater flow is determined from the installed temporary piezometers.

0 50 100 200 Feet

0 20 40 80 Meters

N W S



leido

PORTLAND
AIR NATIONAL GUARD BASE
PORTLAND, OREGON

PROPOSED SAMPLE LOCATIONS A
HANGAR 250, HANGAR 255, AND
FORMER SITE 7 BURN PIT
(PRL 03, 04, AND 11)

ORIGINAL

DRAFT FINAL

SITE INSPECTION REPORT
FOR
PERFLUOROOCTANE SULFONATE AND
PERFLUOROOCTANOIC ACID
AT
PORTLAND AIR NATIONAL GUARD BASE
PORTLAND, OREGON

142nd Fighter Wing
Portland Air National Guard Base
Portland, Oregon

October 2018

AWG COPY

HAFLEY Dan

From: Long, Edward Civ USAF ANG NGB/A7OR [edward.long@ang.af.mil]
Sent: Saturday, November 30, 2013 4:01 PM
To: HAFLEY Dan
Cc: 'Cyrus Gorman'
Subject: RE: Portland ANG - Building 188
Attachments: Building 188 approval.pdf
Signed By: edward.long@us.af.mil

Dan,

Thank you for your input and the approval letter. We will revise and submit a final copy the PA/SI report including the additional information and the proposed approach indicated in the letter.

V/R

Edward Long, PE
ANG/A7OR
Restoration Program Manager
Department of Air Force
3501 Fetchet Avenue
Joint Base Andrews, MD 20762
edward.long@ang.af.mil
(O) 240-612-9511, DSN 612-9511
(Fax) 240-612-7697
Friday Telework: 703-944-3558

-----Original Message-----
From: HAFLEY Dan [mailto:HAFLEY.Dan@deq.state.or.us]
Sent: Friday, November 29, 2013 12:16 PM
To: 'Cyrus Gorman'
Cc: Long, Edward Civ USAF ANG NGB/A7OR
Subject: FW: Portland ANG - Building 188

Cyrus –

Assuming that you/ANG are comfortable with DEQ's proposed approach for Building 188, including preparation of a final revision of the SI submittal, we have two additional (minor) comments to consider in revising the report:

* Section 1.3.1, Page 1-3. Text indicates that DEQ issued a NFA for Sites 1,2,3, and 11 on 24 April 2013. This is incorrect. DEQ has not issued an NFA, but did determine that additional monitoring of wells in the subject areas is no longer necessary as remedial action objectives have been achieved. A NFA is pending final ANG submission of a closure report and necessary public comment. This is expected to take place in 2014.
* Tables. Contaminant concentration units are presented not presented in some tables, for example 1-3 and 1-4. Please check all tables to ensure that units are discussed in the Notes, and revise as necessary.

Dan Hafley

HAFLEY Dan

From: Jones, Stan [Stan.Jones@portofportland.com]
Sent: Tuesday, June 04, 2013 10:21 AM
To: HAFLEY Dan
Cc: Hamilton, Jessica; 'Herb Clough'; Hoffman, Matt
Subject: RE: Figure and cross section for ANG Portland Construction Project

Dan,
It was pointed out to me that I did not convey that a prohibition on excavation in that area is not an option for the Port. Given the future land use and the location, it is likely that that property, in the future will be developed and/or used for utility corridors.
Stan

From: Jones, Stan
Sent: Tuesday, June 04, 2013 8:53 AM
To: 'HAFLEY Dan'
Cc: Hamilton, Jessica; Herb Clough; Hoffman, Matt
Subject: RE: Figure and cross section for ANG Portland Construction Project

Dan,
Thanks for your oversight on this.
The PAHs and their associated risk are pretty straightforward and I think we are both in alignment that the PAHs need to be fully defined and risk addressed . We are probably going to be OK with the ditch fill taking care of the BAP risk – if it has been fully defined. The Guard should be on the hook for future costs associated with the contamination they are leaving in place, as per lease agreements.
Regarding the TPH concentrations detected in some of the samples, these still concern the Port because soils containing TPH at concentrations that we are seeing would require special handling (by DEQ) if excavated, for example, as part of a future utility project. I understand that from a risk standpoint it is not a significant concern, but we see SBP-9 (TPH 1,400 ppm) area as needing further characterization and will ask the Guard to do a bit more work there. With the existing data, it would be difficult for me to tell our project planning engineers where soil requiring special management begins and ends.

Stan

From: HAFLEY Dan [mailto:HAFLEY.Dan@deq.state.or.us]
Sent: Monday, June 03, 2013 11:32 AM
To: 'Christopher J. Pisarri'
Cc: Rein, Roger C Civ USAF ANG 142MSG/EM; Jones, Stan
Subject: RE: Figure and cross section for ANG Portland Construction Project

Folks –

DEQ has completed review of the data tables and Ditch Grading and Soil Boring Locations figure (figure 1) submitted by email. Based on our review, the following appear to be true with respect to environmental contamination in the Former Incinerator Area portion of the "Air National Guard – Surplus" site, located at Portland International Airport:

- PAHs are elevated above occupational risk-based concentrations (RBCs) presented in DEQ's *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (September 2003, later updated). The principal exceedance was for benzo(a)pyrene or BaP. In shallow soil (0-3' bgs), the occupational RBC of 270 ug/kg was exceeded at locations BEM-SB-3, BEM-SB-12, BEM-SB-13, BEM-SBP-6, and BEM-SPB-7. A maximum exceedance ratio of 17.6 was observed at the BEM-SB-3 location. BaP exceeded the construction work RBC of 2,100 ug/kg at

the BEM-SB-3, BD-6 (BEM-SB-1 ,nd ACA Boring A locations. A maximum .eedance quotient of 4.1 was present at the ACA Boring A location.

- Concentrations of metals, VOCs, TPH, and dioxins/furans detected in the Former Incinerator Area are below relevant RBCs or consistent with background concentrations.
- Detections of contaminants above DEQ RBCs are in the southern portion of the Former Incinerator Area, and extending south of the area as defined on Figure 1. The southern extent of the contamination has not been defined.
- Grading information presented in Figure 1 indicates that the area of BaP exeedances will be covered under proposed filling activity by the Air National Guard. Cross Section A shows the thickness of the cover to range from approximately 2 to 2.5 feet. If contamination is present (immediately) south of the BEM-SBP-6 and BEM-SBP-7 locations, it would be covered by at least 2 and up to 4 feet of fill under proposal filling. Filling is shown to extend at least 100 feet south of these sampling locations.
- The source of proposed fill has not been identified. It would presumably meet DEQ Solid Waste requirements for Clean Fill.

Based on this information, it appears that PAH contamination in the southern Former Incinerator Area will be covered by at least two feet of fill. Assuming that the fill is placed as indicated, and that fill is free of environmental contamination that might pose a risk to public health or the environment, conditions in the Former Incinerator Area are unlikely to pose a risk to occupational workers. Two feet of cover is not ideal (as occupational exposure typically considers soil in the 0-3' bgs range), but perhaps adequate in this case. Localized risk to construction workers, notably from contamination at the ACA Boring A location, could be dealt with through worker protection measures or a prohibition on excavation in this area. To the extent that contaminated soil was excavated from this or other portions of the Former Incinerator Area where contamination has been detected, appropriate soil management and disposal would be necessary.

There appears to be one remaining data gap – namely the extent of PAH contamination south of the BEM-SBP-6 and BEM-SBP-7 locations. Unless information is provided to support the conclusion that elevated PAHs observed to date are localized, DEQ recommends the collection of confirmatory soil samples (shallow) from immediately south of the proposed filling area.

I can be reached at (503) 229-5417 if you have questions or comments.

Dan Hafley

From: Christopher J. Pisarri [mailto:cpisarri@bemsys.com]
Sent: Sunday, June 02, 2013 1:39 PM
To: HAFLEY Dan
Cc: Rein, Roger C Civ USAF ANG 142MSG/EM; Jones, Stan
Subject: Figure and cross section for ANG Portland Construction Project
Importance: High

Good afternoon:

Attached is the requested drawing that shows the extent of the construction project along with the location of the soil borings associated with the Phase II EBS study. We have also created a cross-section for review.

Chris

Chris Pisarri .

From: HAFLEY Dan
Sent: Monday, June 03, 2013 11:32 AM
To: 'Christopher J. Pisarri'
Cc: Rein, Roger C Civ USAF ANG 142MSG/EM; Jones, Stan
Subject: RE: Figure and cross section for ANG Portland Construction Project

Folks –

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- Concentrations of metals, VOCs, TPH, and dioxins/furans detected in the Former Incinerator Area are below relevant RBCs or consistent with background concentrations.
- Detections of contaminants above DEQ RBCs are in the southern portion of the Former Incinerator Area, and extending south of the area as defined on Figure 1. The southern extent of the contamination has not been defined.
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Based on this information, it appears that PAH contamination in the southern Former Incinerator Area will be covered by at least two feet of fill. Assuming that the fill is placed as indicated, and that fill is free of environmental contamination that might pose a risk to public health or the environment, conditions in the Former Incinerator Area a unlikely to pose a risk to occupational workers. Two feet of cover is not ideal (as occupational exposure typically considers soil in the 0-3' bgs range), but perhaps adequate in this case. Localized risk to construction workers, notabl from contamination at the ACA Boring A location, could be dealt with through worker protection measures or a prohibition on excavation in this area. To the extent that contaminated soil was excavated from this or other portion the Former Incinerator Area where contamination has been detected, appropriate soil management and disposal wo be necessary.

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I can be reached at (503) 229-5417 if you have questions or comments.

Dan Hafley

BD-

From: Christopher J. Pisarri [mailto:cpisarri@bemsys.com]
Sent: Sunday, June 02, 2013 1:39 PM
To: HAFLEY Dan
Cc: Rein, Roger C Civ USAF ANG 142MSG/EM; Jones, Stan
Subject: Figure and cross section for ANG Portland Construction Project
Importance: High

Good afternoon:

Attached is the requested drawing that shows the extent of the construction project along with the location of the soil borings associated with the Phase II EBS study. We have also created a cross-section for review.

Chris

Chris Pisarri
Program Manager

BEM Systems, Inc. | 16877 E. Colonial Drive, #123 | Tel. - 407.402.4440
www.bemsys.com | Orlando, FL 32820

ANG
Lowell

HAFLEY Dan

Subject: Conference Call to Discuss ANG Portland Phase II Project and next Phase of Work, Conference Call Dial 1 (314) 627-1500, Access Code: 795-846-534
Location: Conference Call

Start: Wed 5/29/2013 2:30 PM
End: Wed 5/29/2013 4:00 PM
Show Time As: Tentative

Recurrence: (none)

Organizer: Christopher J. Pisarri

Importance: High

Due to scheduling conflicts of key personnel, I am proposing to conduct today's call at 2:30 PDT. Key staff required for the meeting will be ANG Portland, a Port of Portland representative and DEQ.

Please use the following call number: Conference Call Dial 1 (314) 627-1500, Access Code: 795-846-534.

The objective of the call is to discuss the most recent results of the sample collection event and discuss ongoing ANG and Port of Portland projects and determine if those activities mitigate the risk of the impacted soil or if there are potential concerns associated with schedule impacts for the proposed construction projects.

A draft map that shows the location of the impacted area along with contaminant concentrations is attached for reference.

Thank you; <<OANG_EBS_Workplan Addendum_Figure1_TGB_results_markup.pdf>>

OANG_EBS_Work
lan Addendum_Fig

Chris

ANG comment

HAFLEY Dan

From: HAFLEY Dan
Sent: Monday, May 27, 2013 1:06 PM
To: 'Albright, Randy'
Subject: RE: OANG GW Monitoring and Closure Activities

Randy –

We have given your comments (below) careful thought, and respect your concerns regarding residual contaminant concentrations in the two wells (MW2-2 and MW11-19). Nevertheless, given that remedial action objectives for Sites 1, 2, 3, and 11 have been achieved, that contaminant concentrations are exhibiting a long-term stable or decreasing trend, and that the area of residual contamination (of any significance) is localized both vertically and horizontally and unlikely to impact groundwater users/uses, DEQ is comfortable with ANG's NFA proposal and determination that additional groundwater monitoring is not necessary.

Please let me know if you have additional questions or concerns.

Dan Hafley

Daniel J. Hafley, RG
Senior Project Manager/Hydrogeologist
Northwest Region Cleanup Section
Oregon DEQ
(503) 229-5417

From: Albright, Randy [mailto:Randy.Albright@portlandoregon.gov]
Sent: Thursday, May 09, 2013 4:58 PM
To: HAFLEY Dan
Subject: OANG GW Monitoring and Closure Activities

Dan - I'm not going to provide a lot of detailed comments, but here's my overall impression:

1. They've done a reasonably good job at a difficult site achieving order-of-magnitude contaminant reductions and reaching their TCLs.

2. Both the linear and log plots do a good job of showing the total contaminant concentration reduction, but some of the log plots suggest that there is still some wide variability in results from one sampling event to the next at several key monitoring locations, including MW2-2, MW11-1, MW11-19 and MW11-20. I would suggest that OANG could be requested to retain at least one well at each of these two sub-sites (e.g. MW2-2 and MW11-19) for continued monitoring of trends and variability for at least another four to eight quarters of routine MNA monitoring, to confirm the success of the last relatively recent treatment cycle.

3. I remain concerned that, given the dominant northeastward GW flow direction in the CRSA, this site could be within the capture zone of CRSA and/or TGA points of diversion for which PWB holds water rights. I am finally about to issue a contract for updating and calibrating our groundwater model for the shallower hydrostratigraphic units in the west well field and one of the deliverables is going to be mapped 30 year capture zones for PWB's currently undeveloped TGA and CRSA water rights, but we won't be at that point until ~the end of this year. Right now, the groundwater system output is pretty well matched to winter season demand and can easily meet water demand for short term winter emergency use, so it's also probably reasonable to assume that PWB won't be

developing their currently undevelope GA or CRSA water rights for at least a. ther decade or two, after we've exhausted existing permit capacity in the SGA, TSA and BLA.

Please let me know if you have any questions or comments or need additional information.

Randy Albright, R.G., L.H.G.
Hydrogeologist
Portland Water Bureau
1120 SW Fifth Avenue #600
Portland, Oregon 97204
Phone: (503) 823-3421
Fax: (503) 823-4500
Email: Randy.Albright@portlandoregon.gov
www.PortlandOnline.com/water

COMM

HAFLEY Dan

From: Grimm, Michael G Civ USAF ANG NGB/A7OR [michael.grimm@ang.af.mil]
Sent: Monday, May 20, 2013 6:07 AM
To: HAFLEY Dan
Cc: Brian Magee (Brian.Magee@erm.com)
Subject: RE: OANG GW Monitoring and Closure Activities
Signed By: michael.grimm.1@us.af.mil

Dan, we do not have significant concerns about the City of Portland's comments and are proceeding with closure of the sites. Anyway, we are unable to continue monitoring due to the lack of available funding.

Your support in this matter is highly appreciated.

Thanks!

-----Original Message-----
From: HAFLEY Dan [mailto:HAFLEY.Dan@deq.state.or.us]
Sent: Friday, May 17, 2013 3:24 PM
To: Grimm, Michael G Civ USAF ANG NGB/A7OR
Cc: Jones, Stan; Rein, Roger C Civ USAF ANG 142MSG/EM
Subject: FW: OANG GW Monitoring and Closure Activities

Michael -

The City of Portland reviewed the ERM closure recommendation for Sites 1, 2, 3, and 11, and provided the comments below. They seem somewhat comfortable with the concept that treatment work is completed at the aforementioned sites, but have recommended additional monitoring at two locations (MW2-2 and MW11-19) for "at least another four to eight quarters" to confirm contaminant trends.

Given that target cleanup levels have been achieved at Sites 1, 2, 3, and 11, and that contaminant concentrations are stable or decreasing in all wells, we do not feel that additional monitoring is necessary and will convey this information to the City. Before we do so, I wanted to check in with you.

Let me know if you have any significant concerns about their comments that might alter ANG plans for proceeding with closure of the sites.

Cordially,

Dan Hafley

From: Albright, Randy [mailto:Randy.Albright@portlandoregon.gov]
Sent: Thursday, May 09, 2013 4:58 PM
To: HAFLEY Dan
Subject: OANG GW Monitoring and Closure Activities

Dan - I'm not going to provide a lot of detailed comments, but here's my overall impression:

1. They've done a reasonably good job at a difficult site achieving order-of-magnitude contaminant reductions and reaching their TCLs.

2. Both the linear and log plots do a good job of showing the total contaminant concentration reduction, but some of the log plots suggest that there is still some wide variability in results from one sampling event to the next at several key monitoring locations, including MW2-2, MW11-1, MW11-19 and MW11-20. I would suggest that OANG could be requested to retain at least one well at each of these two sub-sites (e.g. MW2-2 and MW11-19) for continued monitoring of trends and variability for at least another four to eight quarters of routine MNA monitoring, to confirm the success of the last relatively recent treatment cycle.

3. I remain concerned that, given the dominant northeastward GW flow direction in the CRSA, this site could be within the capture zone of CRSA and/or TGA points of diversion for which PWB holds water rights. I am finally about to issue a contract for updating and calibrating our groundwater model for the shallower hydrostratigraphic units in the west well field and one of the deliverables is going to be mapped 30 year capture zones for PWB's currently undeveloped TGA and CRSA water rights, but we won't be at that point until ~the end of this year. Right now, the groundwater system output is pretty well matched to winter season demand and can easily meet water demand for short term winter emergency use, so it's also probably reasonable to assume that PWB won't be developing their currently undeveloped TGA or CRSA water rights for at least another decade or two, after we've exhausted existing permit capacity in the SGA, TSA and BLA.

Please let me know if you have any questions or comments or need additional information.

Randy Albright, R.G., L.H.G.

Hydrogeologist

Portland Water Bureau

1120 SW Fifth Avenue #600

Portland, Oregon 97204

Phone: (503) 823-3421

Fax: (503) 823-4500

Email: Randy.Albright@portlandoregon.gov

www.PortlandOnline.com/water

ANG COMM

HAFLEY Dan

From: HAFLEY Dan
Sent: Wednesday, May 15, 2013 2:27 PM
To: 'Brian Magee'; Roger Rein; Michael Grimm (Michael.Grimm@ang.af.mil); Jones, Stan
Cc: Herb Clough; Geofrey Moss; Susan Klypchak (susan.l.klypchak.civ@mail.mil)
Subject: RE: 142nd FW Portland ANGB Draft Completion Report

Michael –

DEQ staff reviewed the ***DRAFT Enhanced In Situ Bioremediation Implementation Completion Report*** prepared by ERM for Sites 1, 2, 3, and 11 of the Oregon Air National Guard (Portland International Airport) property and dated May 2013. We have a few (minor) comments for your consideration. Please review and submit a revised (final) report for DEQ approval.

Section 2.4. The effectiveness of earlier in-situ chemical oxidant treatment efforts is perhaps overstated.

Section 4.2.1, Page 4-4. The reference to injection of EHC into wells in separate "lifts" is confusing. Please revise.

Other. There is no discussion of field or laboratory QA/QC associated with the 2013 sampling of wells MW2-2 and MW11-19. A data validation report was not found. Unless this information is presented in a separate deliverable, please include and discuss, including whether there are any qualifications on sampling results.

Other. It would be helpful/illustrative to include contaminant trend plots for, in particular, MW2-2 and MW11-19 to highlight stable-to-decreasing contaminant trends in the two wells with the highest concentrations of residual contaminants. Such plots were previously included in a April 16, 2013 email to DEQ.

Thank you.

Dan Hafley

Daniel J Hafley, RG
Senior Project Manager/Hydrogeologist
Northwest Region Cleanup Section
Oregon DEQ
(503) 229-5417

From: Brian Magee [mailto:Brian.Magee@erm.com]
Sent: Wednesday, May 08, 2013 4:11 PM
To: HAFLEY Dan; Roger Rein; Michael Grimm (Michael.Grimm@ang.af.mil); Jones, Stan
Cc: Herb Clough; Geofrey Moss; Susan Klypchak (susan.l.klypchak.civ@mail.mil)
Subject: 142nd FW Portland ANGB Draft Completion Report

Task 6 Deliverable – *Draft Enhanced In-Situ Bioremediation Implementation Completion Report*
Oregon Air National Guard
142nd Fighter Wing, Portland, Oregon
Contract No. DAHA92-01-D-0005
Delivery Order 0139

All,

On behalf of the NGB I am submitting for your review, the attached pdf of the Draft Enhanced In Situ Bioremediation Implementation Completion Report for ERP Sites 1, 2, 3, and 11 at the 142nd Fighter wing Portland Air National Guard Base in Portland Oregon. Please let me know if you have any questions or comments on this document. I respectfully request that you please submit comments by close of business on 17 May 2013 so that we can finalize this document within the contracted period of performance. Please let me know if this schedule is not possible for you.

Thank you so much for your assistance and review. Sincerely,

Brian Magee, P.G. (CA and WA)

ERM
2525 Natomas Park Dr. Suite 350
Sacramento, California, 95833

Tel: 916 999 8925 (direct line)
Tel: 916 924 9378 (switchboard)
Mobile: 916 747 3192

www.erm.com
brian.magee@erm.com

ANG
ANG
comm

HAFLEY Dan

From: Brian Magee [Brian.Magee@erm.com]
Sent: Tuesday, April 16, 2013 10:03 PM
To: HAFLEY Dan
Cc: Michael Grimm (Michael.Grimm@ang.af.mil); Geofrey Moss
Subject: Portland ANGB Analytical Results April 2013
Attachments: C27141.pdf; Table 1 - 10 April 2013 PANG.PDF; Analytical Results Trend Plot ANG-PORTLAND.PDF

Dan,

Attached please find a historical summary table and trend plots that include the results from the groundwater samples collected from well MW2-2 and MW11-19 on 10 April 2013. These samples were collected to provide an additional data point for the evaluation of trends in the concentration of trichloroethene (TCE) at well MW2-2 and vinyl chloride (VC) at well MW11-19. The analytical results for the two samples showed continued compliance with the target clean-up levels, and concentrations of VOCs that were reduced from the levels reported for October 2012.

You and I discussed these results this morning (16 April 2013). During our conversation you indicated that the results from the samples collected 10 April 2013 were favorable and provide the data that is needed to allow ODEQ to support NGB's recommendation of No Further Response Action Planned. We also discussed that the potential benefits of an additional injection at well MW2-2 in ERP Site 2 is potentially outweighed by the risk to surface water at the base due to demonstrated connection between groundwater and the storm water management system at the Base. For this reason, you indicated that additional injection at MW2-2 will not be required.

Based upon the weight of evidence presented in the Performance Groundwater Monitoring Report for October 2012, the results for the samples collected in April 2013, and the lack of substantial benefit to further work, you indicated that ODEQ can provide concurrence with NGBs recommendation for No Further Response Action Planned. I understand that you discussed this conclusion with the Port of Portland and Stan Jones agrees that the ERP Sites should proceed to closure.

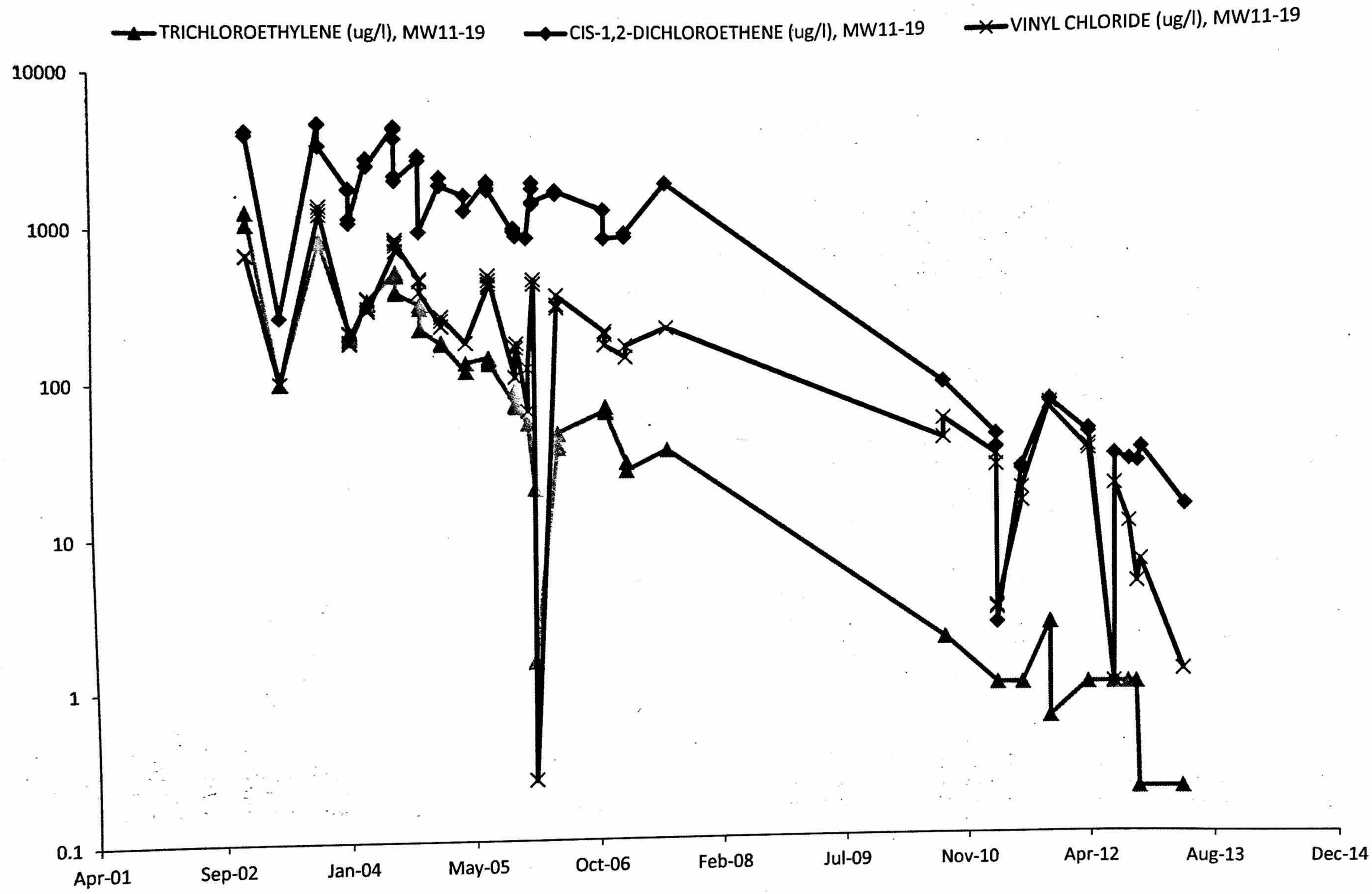
Based upon this discussion, I understand that the following steps remain to be completed for closure of ERP Sites 1, 2, 3, and 11.

- ODEQ will respond to this email and the Final Performance Groundwater Report #5 – October 2013 with a letter indicating concurrence with the recommendation for No Further Response Action Planned
- ERM on behalf of the NGB will submit a completion report for the injection work completed between 2010 and 2013.
- Under a separate contract, NGB will prepare a No Further Action Decision Document for ODEQ Port of Portland and public review and prepare plans for the abandonment of the monitoring and remediation wells.

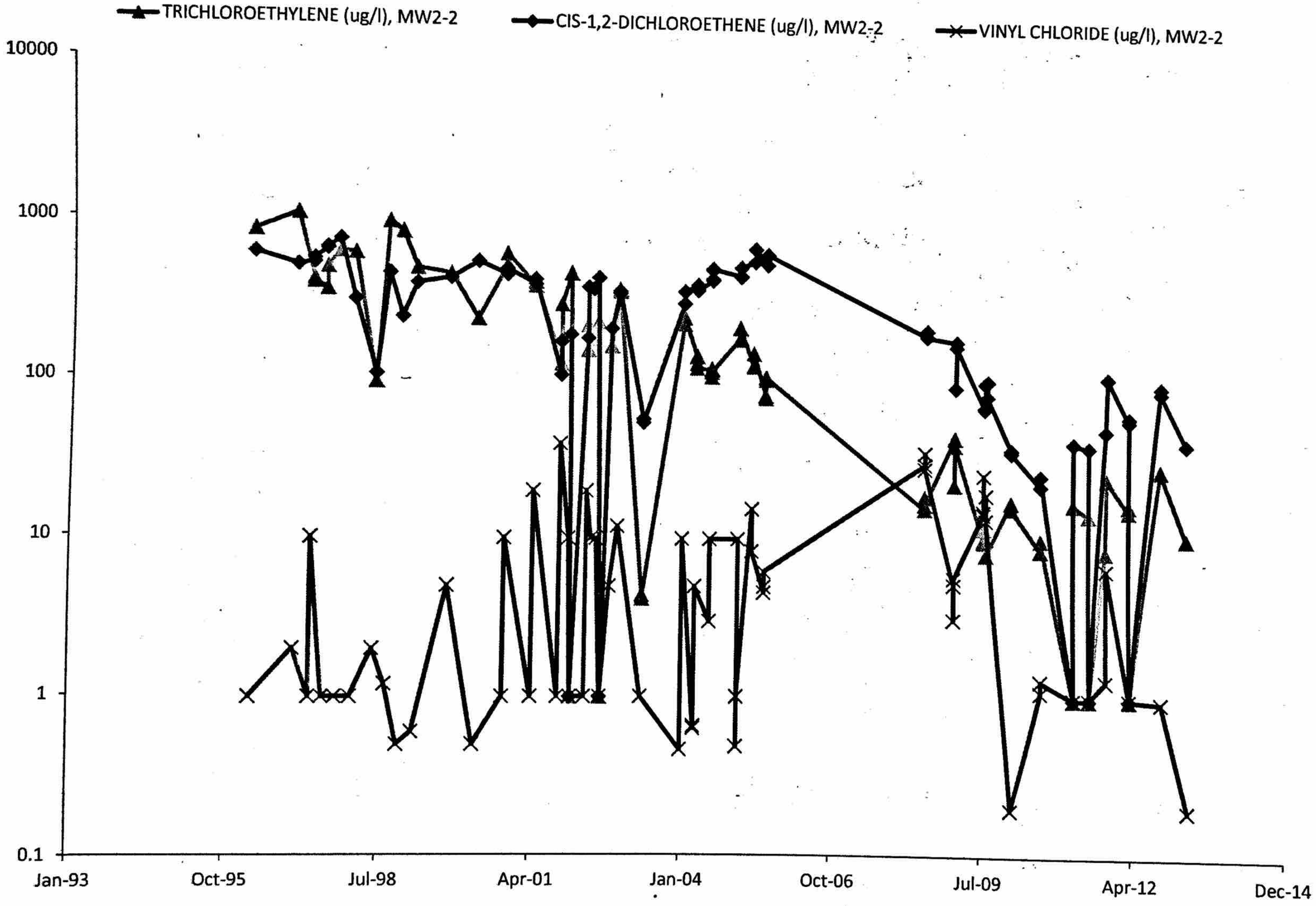
Please let me know if I have not accurately captured this decision or if additional documentation is needed to receive a letter from ODEQ providing concurrence with NFRAP and recommending that the NGB proceed with NFA. It has been a pleasure working with you on this project.

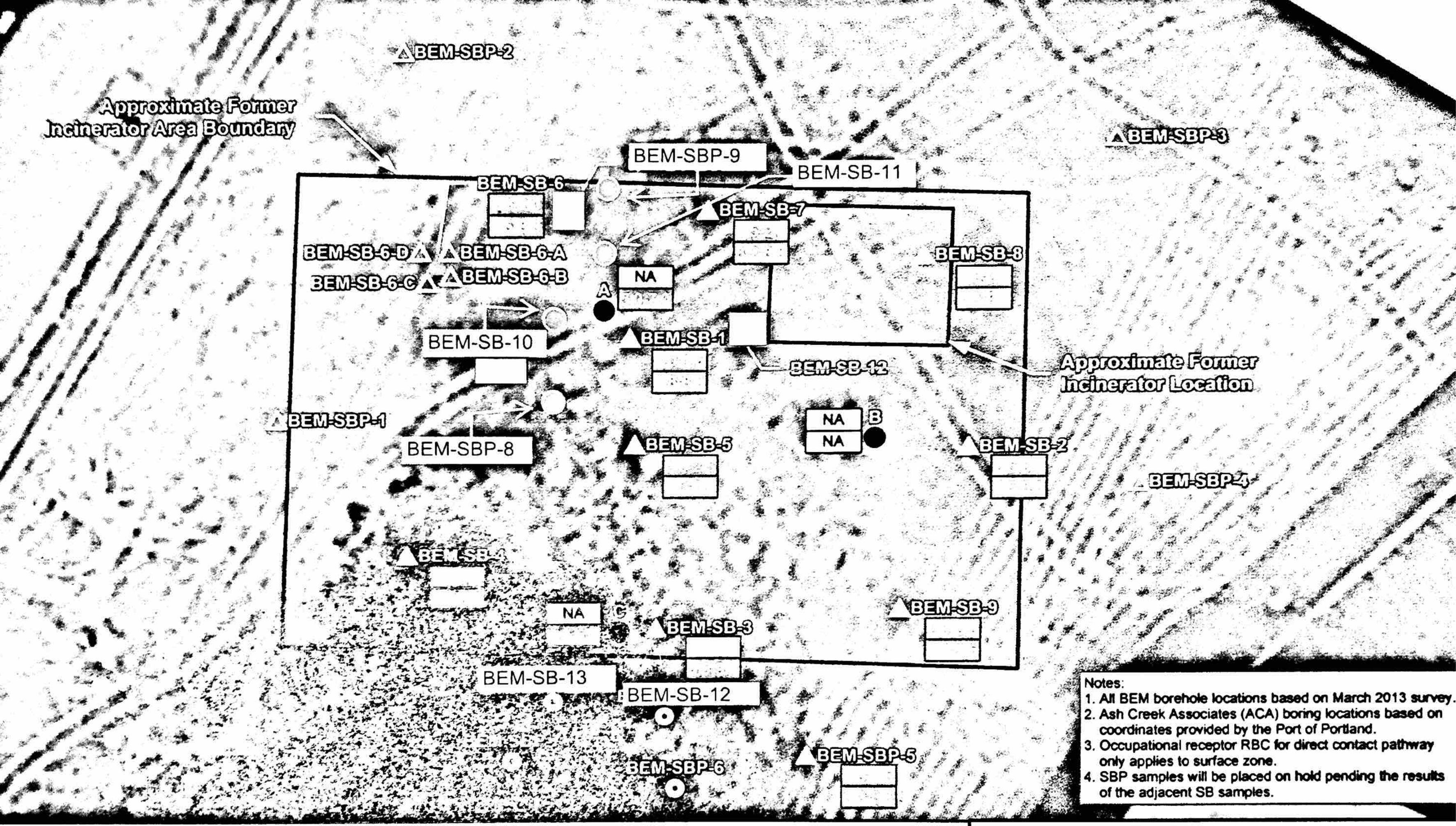
Brian Magee, PG
ERM

Trends in Concentration of PCE, TCE, cis-1,2-DCE, and VC at Well MW11-19



Trends in Concentration of PCE, TCE, cis-1,2-DCE, and VC at Well MW2-2





Notes:
1. All BEM borehole locations based on March 2013 survey.
2. Ash Creek Associates (ACA) boring locations based on coordinates provided by the Port of Portland.
3. Occupational receptor RBC for direct contact pathway only applies to surface zone.
4. SBP samples will be placed on hold pending the results of the adjacent SB samples.

Legend

- ACA Soil Boring (2011)
- Proposed Soil Boring (composite PAH sample, 0-3 ft bgs)
- Proposed Soil Boring (composite TPH sample, 5-7 ft bgs)
- Soil Boring (No Analytical Data Collected)
- Soil Boring
- Soil Boring/Temporary Well

MAP SOURCE: http://server.arcgisonline.com/arcgis/services

	Depth Range (ft)
Surface Zone	0-3
Sub-surface Zone	3-10

= PAH Concentration > than occupational workers direct contact RBC

= PAH Concentration < than all potentially applicable RBCs

NA = No PAH analytical data available

0 50 100 150 Feet

GRAPHIC SCALE

OREGON AIR NATIONAL GUARD BASE LEASE RETURN AREA
PORTLAND INTERNATIONAL AIRPORT
PORTLAND, OREGON

PHASE II EBS SITE ASSESSMENT WORK PLAN ADDENDUM

RBC EXCEEDENCE MAP FOR PAHs IN SOILS AND PROPOSED SOIL BORING LOCATIONS

FIGURE 1

HAFLEY Dan

From: HAFLEY Dan
Sent: Friday, April 05, 2013 11:12 AM
To: 'Herb Clough'; 'Jones, Stan'
Subject: RE: PANG - Surplus Property

Herb and Stan –

Sounds good, although I will defer on conclusions regarding risk (acceptability) until the additional data comes in and risk analysis completed.

Regarding Sites 1, 2, 3, and 11, I spoke to ERM this morning and they will proceed with the sampling of MW2-2 and MW11-19 ASAP, and also seem comfortable with the proposed dosing of MW2-2. I indicated that a very short (email) work plan is acceptable. If data come back acceptable, ANG would like a letter from DEQ by (mid?) May indicating that no additional treatment or monitoring are necessary at Sites 1, 2, 3, and 11. The letter would not be a NFA, but simply allow them to close out this current phase of site work and the current contract with ERM. A (DSMOA) base-wide closure would be completed under a future contract.

DH

From: Herb Clough [mailto:HClough@AshCreekAssociates.com]
Sent: Friday, April 05, 2013 11:02 AM
To: HAFLEY Dan; 'Jones, Stan'
Subject: RE: PANG - Surplus Property

Dan,

Stan and I just had a conversation with the Arcadis folks. We generally concur with the risk approach and expect that the results will show that the risk is acceptable. The Port's additional concern is that the extent of contamination be delineated sufficiently to 1) be sure that the risk calculations are reliable and 2) so that future contractors can be fully informed of the location of the materials (for material handling purposes). It appears your request is addressing item 1. We have asked that they complete additional sampling to address item 2.

Herb

Herb Clough, P.E.
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Ash Creek Associates is now a Division of Apex Companies, LLC. Click here to learn more about Apex.
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From: HAFLEY Dan [mailto:HAFLEY.Dan@deq.state.or.us]
Sent: Friday, April 05, 2013 10:53 AM
To: 'Jones, Stan'
Cc: Herb Clough
Subject: RE: PANG - Surplus Property

Stan –

Great. I am completely comfortable with your requesting a bit of additional work around the ACA "A" location if you feel it is necessary. Hopefully you are satisfied with what we are proposing to delineate around BEM-SB-3. If not, please let me know.

DH

From: Jones, Stan [mailto:Stan.Jones@portofportland.com]
Sent: Friday, April 05, 2013 10:26 AM
To: HAFLEY Dan
Cc: Herb Clough
Subject: RE: PANG - Surplus Property

Dan,
Herb and I had a conf call with the consultant team last week and are going to have another in a few minutes.
We have concerns that they did not sample the zones were we saw contamination (see attached sketch by Herb). We'll give you our 2 cents worth after this meeting.

Stan

From: HAFLEY Dan [mailto:HAFLEY.Dan@deq.state.or.us]
Sent: Friday, April 05, 2013 10:19 AM
To: Jones, Stan
Cc: 'Herb Clough'
Subject: PANG - Surplus Property

Stan –

I had a conversation earlier this week with ERM and others regarding the preliminary results of the Phase II ESB Site Assessment in the former incinerator portion of the Surplus property at PANG. After discussing the results, I indicated that DEQ would like additional samples south and southwest of soil sampling location BEM-SB-3 where elevated PAHs were detected in near-surface soil. DEQ is comfortable with collection of a total of two additional "step-out" samples south/southwest of BEM-SB-3, collected at 1.5-2' bgs (where the elevated PAHs were observed), and analyzed for PAHs only.

ERM indicated that you have concerns about characterization around Ash Creek soil boring location A. We acknowledge your concern, but find the new data adequate in this area. We indicated that they should "sort it out" with the Port.

A modest proposal (apologies to Swift...) for additional sampling should be coming over to DEQ and the Port.

Regarding the berm sampling results, DEQ acknowledges that there were a few detections above relevant RBCs. The data seems adequate for characterization purposes, and it is our understanding that ANG is not seeking a NFA for either the incinerator or berm areas at this time.

Please feel free to contact me if you would like to discuss this matter further.

Regards.

Dan

ANG
COMM

HAFLEY Dan

From: HAFLEY Dan
Sent: Friday, April 05, 2013 10:19 AM
To: stan.jones@portofportland.com
Cc: 'Herb Clough'
Subject: PANG - Surplus Property

Stan –

I had a conversation earlier this week with ERM and others regarding the preliminary results of the Phase II ESB Site Assessment in the former incinerator portion of the Surplus property at PANG. After discussing the results, I indicated that DEQ would like additional samples south and southwest of soil sampling location BEM-SB-3 where elevated PAHs were detected in near-surface soil. DEQ is comfortable with collection of a total of two additional "step-out" samples south/southwest of BEM-SB-3, collected at 1.5-2' bgs (where the elevated PAHs were observed), and analyzed for PAHs only.

ERM indicated that you have concerns about characterization around Ash Creek soil boring location A. We acknowledge your concern, but find the new data adequate in this area. We indicated that they should "sort it out" with the Port.

A modest proposal (apologies to Swift...) for additional sampling should be coming over to DEQ and the Port.

Regarding the berm sampling results, DEQ acknowledges that there were a few detections above relevant RBCs. The data seems adequate for characterization purposes, and it is our understanding that ANG is not seeking a NFA for either the incinerator or berm areas at this time.

Please feel free to contact me if you would like to discuss this matter further.

Regards.

Dan

Daniel Hafley

Daniel Hafley

Cc: 'Cyrus Gorman'
Subject: stan.jones@portofportland.com; Doug Barber; Rein, Roger C Civ USAF ANG 142MSG/EM
Portland ANGB Work Plan - Building 188

Cyrus –

DEQ staff reviewed the ***Draft Final Site Investigation Work Plan*** prepared by ERM for the Air National Guard and dated February 2013. The work plan outlines soil and groundwater sampling to be completed at Building 188 of the Portland Air National Guard site, associated with a former vehicle maintenance sump. Sampling around/below the sump in 2009 under the Guard "One Clean" program identified low levels of petroleum hydrocarbons and related constituents in soil and groundwater. The stated objective of investigation work is to determine the presence or absence of contamination sufficient to: 1) receive a no further action determination from DEQ; or 2) prompt additional investigation efforts.

Our comments on the work plan are presented below for your consideration.

Section 4.1. Text appropriately mentions screening of sampling results against risk-based screening values presented in DEQ's *Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites* (RBDM, September 2003, subsequently updated). EPA Regional Screening Levels (RSLs) should only be used if DEQ RBCs are not available. Regarding use, it should be noted that drinking is not considered a relevant human exposure pathway for shallow groundwater based on the *Land and Beneficial Water Use Survey Update, Portland International Airport* dated December 12, 2012 and approved by DEQ. Risk screening should be completed accordingly. Assuming that contamination in the former sump area is localized (aerially) and does not extend to deeper aquifers, the primary exposure pathways of concern would be vapor migration (indoor air) and excavation worker direct contact.

Please discuss the rationale for the soil and groundwater sampling locations proposed. Soil boring/sampling locations presumably represent "step-out" locations as a follow-up to 2009 site investigation work. The positioning of the three monitoring wells is not clear. Are VMA-7 and -8 presumed to be downgradient of the former sump, and VMA-9 upgradient? Given variations in gradient that have been observed over time in the shallow site aquifer, it may be more prudent to position the three wells in a circle around the former sump. Please discuss.

Section 4.2. No analysis for metals, PCBs, and non-PAH semi-volatile organic compounds is proposed, nor do these analyses appear to have been completed during 2009 site investigation work. Please support exclusion of these contaminant classes from analytical work. If groundwater samples are analyzed for metals, both total and dissolved analyses should be completed.

Tables 1-2 through 1-7. 2009 sampling results are screened against EPA RSLs and values from DEQ's *Pre-Calculated Hot Spot Look-Up Tables* guidance (October 20, 1998). Also, a number of the screening values presented could not be confirmed by DEQ. Use of RBDM screening values is recommended as discussed above.

Other. Sampling results from 2009 show only very low concentrations of petroleum or petroleum-related contaminants in soil and groundwater, none of which appear to exceed risk based concentrations relevant to the site. The presumed purpose of sampling is to *confirm* that significant impacts are not present in the Building 188 area.

I can be reached at (503) 229-5417 if you have questions or comments. Please consider any comments submitted by the Port of Portland or their consultant before revising the work plan for approval and implementation.

Respectfully,

HAFLEY Dan

From: Brian Magee [Brian.Magee@erm.com]
Sent: Wednesday, January 23, 2013 8:53 AM
To: HAFLEY Dan
Subject: RE: Portland ANG
Attachments: Table 3-3.pdf; Table 3-4.pdf; Table 3-5.pdf

Dan,

As usual your sense of timing is spot on. The report for the October monitoring event is in review by the NGB and should be making it to you and the stakeholders next week. I have attached the tables with the VOC data if you are interested in a preview.

In October, we sampled a broad set of wells at both ERP Sites using low-flow sample collection methods. As we had hoped this event showed compliance for all constituents both at ERP Sites 1, 2, and 3 and at ERP Site 11. With the exception of VC at well MW11-19, this was the fourth consecutive semi-annual event in which all constituents were compliant. As you will see, MW11-19 showed good response to injection of oil at the well with a decrease in the concentration of all COCs and strong evidence for ongoing reductive dechlorination. Based upon this I am recommending closure for both ERP sites.

This will all be presented in the groundwater report; however, if you are available to have a quick chat about the data I would be glad to get your perspective on the how the conclusions are presented.

Thanks!

Brian Magee, PG
Senior Geologist

ERM
2525 Natomas Park Dr. Suite 350
Sacramento, CA
95833

Tel: 916-999-8925 (direct line)
Tel: 916-924-9378 (switchboard)
Mobile: 916-747-3192

www.erm.com
brian.magee@erm.com

From: HAFLEY Dan [mailto:HAFLEY.Dan@deq.state.or.us]
Sent: Wednesday, January 23, 2013 8:09 AM
To: Brian Magee
Subject: Portland ANG

Brian –

I have not received anything regarding Portland ANG (Sites 2 and 11) for a while. Where are we in the sampling/reporting cycle, and do you contemplate submitting closure materials for either in the near future?

3.0 ENVIRONMENTAL SETTING

3.1 CLIMATE

Portland ANGB is situated in a temperate climate region with mild winters and summers. The area is subject to low-volume, high-frequency rainfall events in the early spring and fall. The average temperature of Multnomah County, Oregon is 53.60°F, which is higher than most of Oregon and is similar to the national average temperature of 54.45°F. Annual rainfall amounts in Multnomah County are 45.59 in. with 105.04 days of 0.1 in. of rain or more of precipitation. Average annual snowfall in the area is 2.80 in. Average wind speed for the area is 14.86 miles per hour and is usually out of the west and northwest (USA.com 2017).

3.2 TOPOGRAPHY

Portland ANGB is located on a levee-protected floodplain of the Columbia River. Portland ANGB and Portland International Airport are bordered by the Columbia River to the north and the Columbia Slough to the south. The local floodplain has little to no natural topography and gently slopes north toward the Columbia River. Portland International Airport and Portland ANGB average 30 ft above mean sea level (AMSL) (BEM and Arcadis 2013).

3.3 GEOLOGY

Multnomah County and Portland, Oregon are located on a topographic boundary known as the Columbia Plateau, a region marked by Eocene volcanic features and late Miocene fluvial deposits from the Cascade Mountain Range. Portland ANGB is situated on quaternary age terrace alluvium, composed of floodplain and terraced bedded sands, silts, and clays ranging in thickness from 100 to 200 ft. The terrace alluvium locally overlies the Troutdale Formation, which is approximately 800 to 900 ft thick, and while nearly horizontal has very gentle slopes to the west and southwest. The Troutdale Formation consists of well-sorted, coarse-grained sandstone and a conglomerate with well-rounded quartzite pebbles set in a very fine clay mineral matrix. The upper few feet of the formation are highly weathered and nearly indistinguishable from prolonged exposure. The Troutdale Formation strikes to the north and gently dips to the west and southwest at 2 degrees (DOI 1963).

Borings drilled during the Leidos SI did not reach refusal or bedrock and were typically drilled to 5 to 15 ft below ground surface (BGS). The boring logs show some locations with plastic clay and others with interbedded moist sand, silt, and clay, which confirm the presence of bedded layers. Some borings had red nodules within clay layers. Monitoring well bores were advanced to 15.5 ft BGS. Borings consisting mostly of clay followed the trend of gray/brown silty clay giving way to some brown loose clay, then brown tight clays. Borings exhibiting this include POR05-SB1 and POR05-SB2; POR4-SB2 and POR4-SB3; POR11-SB1, POR11-SB2, and POR11-SB3 (which contained some angular gravel); POR03-SB1 and POR03-SB2; MW-POR04-01; and POR04-SB1. Borings exhibiting interbedding of sands and clays include MW-POR010-SB1, POR5-SB3, POR6-SB1 and POR6-SB2; POR07-SB1 and POR07-SB2; POR08-SB1 and POR08-SB2; POR02-SB1 (which also contained some angular gravel); and POR02-SB2. The wells installed had depths to water between 4.0 and 14.0 ft BGS.

3.4 SOIL

Soils at Portland ANGB have been classified during previous site investigations and are separated into two distinct categories. The primary soil underlying most of Portland ANGB is the Pilchuck Soil Complex. The Pilchuck Soil Complex is composed of 1 ft of silty topsoil underlain by 5 ft of well-sorted, highly permeable, dark brown sands. The other soil type found at Portland ANGB is the Sauvie-Rafton Complex, consisting of 75 to 90 in. of poorly drained soils that are silty loam to silty clay in texture.

Sauvie-Rafton soils are a common component of floodplain structures along the Columbia River, much like the one on which Portland ANGB is situated (ERM 2013).

These soil descriptions are consistent with field logs, as some borings had silty sand underlain by dark brown sands and others had a majority of gray silt/clay mix of differing plasticity.

3.5 SURFACE WATER HYDROLOGY

Natural and significant surface water bodies and both navigable and non-navigable waterways are located at and adjacent to Portland ANGB. Surface water flow from Portland ANGB and Portland International Airport eventually drains to the Columbia Slough. The Columbia Slough is directly south of Portland ANGB and is a complex of narrow and shallow channels extending approximately 18 miles within the southern floodplain of the Columbia River. The Columbia River is the major surface water feature located to the north of Portland ANGB and Portland International Airport. The Columbia Slough receives water from springs to the northeast of Portland International Airport and local groundwater seepage from shallow saturated zones, as well as local surface water runoff from Portland ANGB.

Surface water flow at Portland ANGB is dictated by the Base's man-made surface drainage system. Stormwater is captured by drainage ditches throughout the property, which then directs the flow to two man-made stormwater detention ponds on Portland ANGB. The drainage ditch footprint occupies approximately 1.8 acres and consists of two branches. The main branch is approximately 2,800 ft long, and the north branch extends approximately 1,700 ft. The two branches converge at the point of discharge to the detention ponds. The outfall from the upper detention pond can be closed, allowing the pond to be used as a containment area. Stormwater is discharged from the upper pond to the lower pond before it is conveyed to Portland International Airport's detention pond and then to Columbia Slough (ERM 2013).

3.6 HYDROGEOLOGY

Significant hydrogeologic units are present in the vicinity of Portland International Airport. These units include, in descending order, the Overbank Deposits, the Columbia River Sand Aquifer (CRSA), the Troutdale Gravel Aquifer (TGA), Confining Unit 1, the Troutdale Sandstone Aquifer, Confining Unit 2, and the Sand and Gravel Aquifer. Several of the hydrogeologic units underlying Portland International Airport are part of a regional aquifer system that serves as the city of Portland's supplemental water supply. Shallow groundwater at the Base occurs within the shallow alluvial terrace deposits and has been encountered during various investigations at depths ranging from 2 to 10 ft BGS. The inferred groundwater flow direction in the Overbank Deposits is predominantly toward the west and northwest. This differs from the CRSA, where recorded water level measurements suggest that the groundwater flow direction fluctuates between northeast and south. Generally, the water table is lowest in the late summer and fall and highest in the winter and spring (BB&E 2016).

According to the 2006 environmental baseline survey (EBS), the shallowest water-bearing zone is a discontinuous, unconfined to semi-confined water-bearing sand unit, the top of which ranges in depth from 5.5 to 9 ft BGS and ranges in thickness from 3 to 19 ft. The discontinuous lenses of the upper zone are in scattered locations throughout the northern, eastern, and southwestern portions of Portland ANGB (CH2M Hill 2006).

Groundwater flow direction varies between water-bearing units and tends to fluctuate seasonally and in response to changes in the Columbia River stage caused by releases from Bonneville Dam. In the shallow aquifer, groundwater predominantly flows toward the west and northwest, although the flow direction varies considerably locally. Water levels in the shallow zone are influenced by recharge/discharge through drainage ditches throughout the subject property and the Columbia Slough to the south, although

the hydraulic connection between the slough and the shallow aquifer may be muted by low-permeability sediments in the bed of the slough (CH2M Hill 2006).

The groundwater information collected from the nine new monitoring wells installed during the Leidos SI field activities confirmed a west-northwest flow of shallow groundwater. The shallow water table occurs at varying depths within Portland ANGB. Soil boring logs indicate shallow groundwater was encountered at depths ranging from 4 ft BGS in POR06-SB2 to 14 ft BGS in POR11-SB2. Groundwater was encountered in all soil borings between these depths. Groundwater levels collected before purging and sampling monitoring wells installed during the SI indicate the depth to shallow groundwater ranged from 3.98 ft BGS in MW-POR05-01 to 12.63 ft BGS in MW-POR10-01. Groundwater elevations were 13.05 ft Above North American Vertical Datum of 1988 (ANAVD88) in MW-POR05-01 and 9.15 ft ANAVD88 in MW-POR10-01.

3.7 CRITICAL HABITATS AND ENDANGERED/THREATENED SPECIES

According to the U.S. Fish and Wildlife Service (USFWS), the following federally listed threatened, endangered, or proposed species are known to or are believed to occur in Multnomah County, Oregon (USFWS 2017a):

- Mammals:
  - Columbian white-tailed deer (*Odocoileus virginianus leucurus)* – Threatened.
- Snails:
  - Puget oregonian (*Cryptomastix devia*) – Threatened.
- Fish:
  - Bull trout *(Salvelinus confluentus*) – Threatened.
- Birds:
  - Northern spotted owl *(Strix occidentalis caurina)* – Threatened,
  - Yellow-billed cuckoo (*Coccyzus americanus*) – Threatened,
  - Marbled murrelet (*Brachyramphus marmoratus*) – Threatened, and
  - Streaked horned lark (*Eremophila alpestris strigata*) – Threatened.
- Plants:
  - Nelson's checker-mallow (*Sidalcea nelsoniana*) – Threatened,
  - Golden paintbrush (*Castilleja levisecta*) – Threatened, and
  - Kincaid's lupine (*Lupinus sulphureus ssp. kincaidii*) –Threatened.

The potential for these species to occur in Multnomah County does not mean they are present at Portland ANGB.

The USFWS National Wetlands Inventory indicates roughly 0.54 acres are designated as wetlands along the ditch lines within the Portland ANGB property (USFWS 2017b).

3.8 WATER WELLS

The PA Report (BB&E 2016) indicates 153 federal or public water wells are within a 1-mile radius of the Base. One well is listed on the U.S. Geological Survey database, which usually lists monitoring or test wells. Other than a construction date of 1959, no additional relevant information was provided about this well. The remaining 152 water wells listed in the Environmental Data Resources (EDR) Report are on the

the hydraulic connection between the slough and the shallow aquifer may be muted by low-permeability sediments in the bed of the slough (CH2M Hill 2006).

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  - Bull trout *(Salvelinus confluentus*) – Threatened.
- Birds:
  - Northern spotted owl *(Strix occidentalis caurina)* – Threatened,
  - Yellow-billed cuckoo (*Coccyzus americanus*) – Threatened,
  - Marbled murrelet (*Brachyramphus marmoratus*) – Threatened, and
  - Streaked horned lark (*Eremophila alpestris strigata*) – Threatened.
- Plants:
  - Nelson's checker-mallow (*Sidalcea nelsoniana*) – Threatened,
  - Golden paintbrush (*Castilleja levisecta*) – Threatened, and
  - Kincaid's lupine (*Lupinus sulphureus ssp. kincaidii*) –Threatened.

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state's database. The majority of these wells appeared to be monitoring wells and none were listed as potable wells (BB&E 2016).

The city of Portland has a well field approximately 0.75 miles east/northeast of the Base, which is used as a supplemental water supply for the city of Portland. In addition, information provided from the 2006 EBS shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query (http://www.wrd.state.or.us). In addition, Mr. Roger Rein, the 142nd FW Environmental Manager, provided a list of eight unregistered wells that are located between 0.75 and 1.25 miles from the Base. According to Mr. Rein, some of these wells are used for domestic consumption (BB&E 2016).

4.0 PRELIMINARY ASSESSMENT

In 2016, BB&E conducted a PA to identify potential sites of historical environmental releases of PFOS/PFOA related to AFFF usage and storage at Portland ANGB (BB&E 2016). The PA evaluated a total of 10 PRLs and recommended 9 of these for further investigation under an SI (Table 1; see also Figure 1). During the September 2017 site visit, stakeholder discussions resulted in deviation from the PA with respect to the PRLs being evaluated in the SI. It was determined that investigation at the POL Storage – Building 431 (PRL 9) would be replaced with investigation at the former IRP Site 7 Burn Pit (designated as PRL 11 in the SI WP) (Leidos 2018). At the time of the 2016 PA, no documentation was available showing that soil, groundwater, sediment, and surface water at Portland ANGB were previously tested for PFOS/PFOA; therefore, these compounds could be present in media at any of these PRLs.

BB&E researched the potential existence of any documented FTAs or any other use or release of AFFF. No evidence was found that a current or former FTA that utilized AFFF was located within the footprint of the Portland ANGB site boundary; however, an offsite FTA (former IRP Site 7 Burn Pit) was included in this SI based on stakeholder discussions. The PA site visit included onsite interviews with active and former personnel from the ANGB and other parties with relevant historical site knowledge.

The following sections briefly describe the operational history and waste characteristics of the PRLs included in this SI, as presented in the PA Report (BB&E 2016) and PRL 11 from the SI WP. PRL numbers correspond to the area of concern designation used in the PA Report, and all building descriptions, AFFF inventories, and release histories reflect conditions at the time of the August 2015 BB&E site visit.

4.1 PRL 2: NEW FIRE DEPARTMENT – BUILDING 180

The new Fire Department – Building 180 was constructed in 2005. According to personnel that have worked at the Base Fire Department since the late 1980s, the AFFF stored at this location is currently in Fire/Crash Response vehicles, including three crash trucks (two 25-gal trucks and one 250-gal truck), one fire engine (250 gal), and one foam trailer (2,000 gal). One former crash truck, awaiting disposal at the motor pool, contained 130 gal. Fire Department personnel indicated that minor spills had occurred during filling the vehicles over the years from onsite containers (now removed) and minor leaks from the equipment. In addition, at least three occurrences of AFFF being discharged to the stormwater sewer system were documented in the Annual Stormwater Reports.

4.2 PRL 3: HANGAR 250

Hangar 250 was built in 1985. AFFF is stored in fire suppression equipment in the mechanical room of this hangar. According to the label, the tank has a design capacity of 200 gal, but the net contents are 55 gal of AFFF. Minor leaks of AFFF have occurred in this room, with no reported inadvertent releases in the hangar. Currently, no AFFF is present in the hangar, although one empty 55-gal barrel is currently present. No records of spills are reported to have occurred at this location.

4.3 PRL 4: HANGAR 255

Hangar 255 was constructed in 1956. AFFF is stored in fire suppression equipment in the mechanical room of this hangar. The placard on the tank states that it contains 600 gal of AFFF manufactured in 1994. Minor leaks of AFFF have occurred in this room, with an inadvertent release in the main hangar.

On October 19, 2005, Environmental Management (EM) personnel noticed foam on the pavement near Hangar 255 and questioned the local office personnel. The investigation indicated that the AFFF system

- Streaked horned lark (*Eremophila alpestris strigata*) – Threatened.

- Plants:
  - Nelson's checker-mallow (*Sidalcea nelsoniana*) – Threatened,
  - Golden paintbrush (*Castilleja levisecta*) – Threatened, and
  - Kincaid's lupine (*Lupinus sulphureus ssp. kincaidii*) –Threatened.

The potential for these species to occur in Multnomah County does not mean they are present at Portland ANGB.

The USFWS National Wetlands Inventory indicates roughly 0.54 acres are designated as wetlands along the ditch lines within the Portland ANGB property (USFWS 2017b).

3.8 WATER WELLS

The PA Report (BB&E 2016) indicates 153 federal or public water wells are within a 1-mile radius of the Base. One well is listed on the U.S. Geological Survey database, which usually lists monitoring or test wells. Other than a construction date of 1959, no additional relevant information was provided about this well. The remaining 152 water wells listed in the Environmental Data Resources (EDR) Report are on the

state's database. The majority of these wells appeared to be monitoring wells and none were listed as potable wells (BB&E 2016).

The city of Portland has a well field approximately 0.75 miles east/northeast of the Base, which is used as a supplemental water supply for the city of Portland. In addition, information provided from the 2006 EBS shows several additional water wells around the Base. Two water wells were identified in the EBS within a 1-mile radius of the property. However, these wells are not listed as existing wells on the State of Oregon Water Resources Department, online Well Log Query (http://www.wrd.state.or.us). In addition, Mr. Roger Rein, the 142nd FW Environmental Manager, provided a list of eight unregistered wells that are located between 0.75 and 1.25 miles from the Base. According to Mr. Rein, some of these wells are used for domestic consumption (BB&E 2016).

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

This section presents the SI conclusions and recommendations for each PRL. The recommended DQOs are based on data collected by Leidos during this SI and an evaluation of the analytical results compared to applicable screening criteria.

6.1.1 PRL 2: New Fire Department – Building 180

Although PFOS/PFOA compounds were detected in PRL 2 soil samples, evaluation of soil analytical data compared to soil screening criteria indicates there are no calculated residential risk-based screening level exceedances for PFOS, PFOA, or PFBS for soil in PRL 2.

Evaluation of groundwater data compared to screening criteria indicates an exceedance of the EPA HA (70 ng/L) in MW-POR02-01 and MW-POR02-02 for PFOS and PFOA (combined), with results of 42,970 and 2,660 ng/L, respectively. MW-POR02-01 had the highest PFOS and combined PFOS and PFOA concentrations at Portland ANGB.

Based on the SI results, the following DQOs are recommended for PRL 2:

- Additional surface and subsurface soil samples to determine if a previously undetected source area exists that is contributing to the groundwater exceedances; and

- Additional investigation to determine the nature and extent of PFOS/PFOA in groundwater (both laterally and vertically), through sampling of additional new monitoring wells located both upgradient of and downgradient from PRL 2.

6.1.2 PRL 3: Hangar 250

Although PFOS/PFOA compounds were detected in PRL 3 soil samples, evaluation of soil analytical data compared to soil screening criteria indicates there are no calculated residential risk-based screening level exceedances for PFOS,PFOA, or PFBS for soil in PRL 3.

PRL 3 is co-located with PRL 4. The monitoring well installed at PRL 4 was used to evaluate the groundwater at PRL 3. Evaluation of groundwater data compared to screening criteria indicates an exceedance of the EPA HA (70 ng/L) in MW-POR04-01 for PFOS and PFOA (combined), with a result of 273 ng/L.

Based on the SI results, the following DQOs are recommended for PRL 3:

- Additional surface and subsurface soil samples to determine if a previously undetected source area exists that is contributing to the groundwater exceedances; and

- Additional investigation to determine the nature and extent of PFOS/PFOA in groundwater (both laterally and vertically), through sampling of additional new monitoring wells located both upgradient of and downgradient from PRL 3.

6.1.3 PRL 4: Hangar 255

Although PFOS/PFOA compounds were detected in PRL 4 soil samples, evaluation of soil analytical data compared to soil screening criteria indicates there are no calculated residential risk-based screening level exceedances for PFOS, PFOA, or PFBS for soil in PRL 4.

PRL 4 is co-located with PRL 3. Evaluation of groundwater data compared to screening criteria indicates an exceedance of the EPA HA (70 ng/L) in MW-POR04-01 for PFOS and PFOA (combined), with a result of 273 ng/L.

Based on the SI results, the following DQOs are recommended for PRL 4:

- Additional surface and subsurface soil samples to determine if a previously undetected source area exists that is contributing to the groundwater exceedances; and

- Additional investigation to determine the nature and extent of PFOS/PFOA in groundwater (both laterally and vertically), through sampling of additional new monitoring wells located both upgradient of and downgradient from PRL 4.

6.1.4 PRL 5: Old Fire Department and Swale – Building 290

Although PFOS/PFOA compounds were detected in PRL 5 soil samples, evaluation of soil analytical data compared to soil screening criteria indicates there are no calculated residential risk-based screening level exceedances for PFOS, PFOA, or PFBS for soil in PRL 5.

Evaluation of groundwater data compared to screening criteria indicates an exceedance of the EPA HA (70 ng/L) in MW-POR05-01 for PFOS and PFOA (combined), with a result of 2,340 ng/L.

In addition, sediment results from within the drainage swale indicated all six PFOS/PFOA compounds were detected. Evaluation of sediment analytical data compared to soil screening criteria indicates there are no calculated residential risk-based screening level exceedances for PFOS,PFOA, or PFBS for sediment at PRL 5.

Based on the SI results, the following DQOs are recommended for PRL 5:

- Additional surface and subsurface soil samples to determine if a previously undetected source area exists that is contributing to the groundwater exceedances;

- Additional investigation to determine the nature and extent of PFOS/PFOA in groundwater (both laterally and vertically), through sampling of additional monitoring wells located both upgradient of and downgradient from PRL 5;

- Additional investigation to confirm the concentrations of PFOS/PFOA in sediment within the drainage swale to further evaluate the PFOS/PFOA impacts; and

- Surface water investigation within the drainage swale to evaluate PFOS/PFOA impacts.

6.1.5 PRL 6: Hangar 310

Although PFOS/PFOA compounds were detected in PRL 6 soil samples, evaluation of soil analytical data compared to soil screening criteria indicates there are no calculated residential risk-based screening level exceedances for PFOS, PFOA, or PFBS for soil in PRL 6.

Evaluation of groundwater data compared to screening criteria indicates exceedances of the EPA HA (70 ng/L) in MW-POR06-01 for PFOS and PFOA (combined), with a result of 720 ng/L.

Based on the SI results, the following DQOs are recommended for PRL 6:

- Additional surface and subsurface soil samples to determine if a previously undetected source area exists that is contributing to the groundwater exceedances; and
- Additional investigation to determine the nature and extent of PFOS/PFOA in groundwater (both laterally and vertically), through sampling of additional monitoring wells located both upgradient of and downgradient from PRL 6.

6.1.6 PRL 7: Hangar 380

Although PFOS/PFOA compounds were detected in PRL 7 soil samples, evaluation of soil analytical data compared to soil screening criteria indicates there are no calculated residential risk-based screening level exceedances for PFOS,PFOA, or PFBS for soil in PRL 7. Sediment sample results from the catch basin located outside mechanical room on the southeastern side of the Hangar 380 indicated all six PFOS/PFOA compounds were detected. Evaluation of sediment analytical data compared to soil screening criteria indicates there are no calculated residential risk-based screening level exceedances for PFOA or PFBS. However, the PFOS concentration in the sediment sample (1,800 µg/kg) exceeded the residential risk-based screening level for PFOS.

Evaluation of groundwater data compared to screening criteria indicates exceedances of the EPA HA (70 ng/L) in MW-POR07-01 for PFOS and PFOA (combined), with a result of 355 ng/L. Evaluation of surface water data compared to screening criteria indicates exceedances of the EPA HA (70 ng/L) in POR07-SW1 for PFOS and PFOA (combined), with a result of 3,360 ng/L.

Based on the SI results, the following DQOs are recommended for PRL 7:

- Additional surface and subsurface soil samples to determine if a previously undetected source area exists that is contributing to the groundwater exceedances;
- Additional investigation to determine the nature and extent of PFOS/PFOA in groundwater (both laterally and vertically), through sampling of additional new monitoring wells located both upgradient of and downgradient from PRL 7; and
- Additional investigation to confirm the concentrations of PFOS/PFOA in surface water and sediment, which should include additional sampling of surface water and sediment within the catch basin at Hangar 380 as well as upgradient of and downgradient from PRL 7 to further evaluate the PFOS/PFOA impacts.

6.1.7 PRL 8: Hangar 375

Although PFOS/PFOA compounds were detected in PRL 8 soil samples, evaluation of soil analytical data compared to soil screening criteria indicates there are no calculated residential risk-based screening level exceedances for PFOS, PFOA, or PFBS for soil in PRL 8.

Evaluation of groundwater data compared to screening criteria indicates an exceedance of the EPA HA (70 ng/L) in MW-POR08-01 for PFOS and PFOA (combined), with a result of 550 ng/L.

Based on the SI results, the following DQOs are recommended for PRL 8:

- Additional surface and subsurface soil samples to determine if a previously undetected source area exists that is contributing to the groundwater exceedances; and

- Additional investigation to determine the nature and extent of PFOS/PFOA in groundwater (both laterally and vertically), through sampling of additional new monitoring wells located both upgradient of and downgradient from PRL 8.

6.1.8 PRL 10: Ponds/Stormwater Retention Basins

Although PFOS/PFOA compounds were detected in PRL 10 soil samples, evaluation of soil analytical data compared to soil screening criteria indicates there are no calculated residential risk-based screening level exceedances for PFOS, PFOA, or PFBS for soil in PRL 10. Evaluation of results from the five sediment samples indicates PFOS, PFOA, or PFBS concentrations did not exceed the soil screening criteria.

Evaluation of groundwater data compared to screening criteria indicates an exceedance of the EPA HA (70 ng/L) in MW-POR10-01 for PFOS and PFOA (combined), with a result of 172 ng/L. Evaluation of surface water data compared to screening criteria indicates an exceedance of the EPA HA (70 ng/L) in all five surface water samples for PFOS and PFOA (combined), with results ranging from 1,052 to 1,744 ng/L.

Based on the SI results, the following DQOs are recommended for PRL 10:

- Surface and subsurface soil samples to determine if a previously undetected source area exists that is contributing to the groundwater exceedances.

- Additional investigation to determine the nature and extent of PFOS/PFOA in groundwater (both laterally and vertically), through sampling of additional new monitoring wells located both upgradient of and downgradient from PRL 10.

- Additional investigation to confirm the concentrations of PFOS/PFOA in surface water and sediment, which should include additional sampling of surface water and sediment to further evaluate the PFOS/PFOA impacts. Additional surface water and sediment samples should be collected from the drainage ditch network, potential upgradient sources, and downstream discharge locations from the retention basins located off Base.

6.1.9 PRL 11: Former IRP Site 7 Burn Pit

Although PFOS/PFOA compounds were detected in PRL 11 soil samples, evaluation of soil analytical data compared to soil screening criteria indicates there are no calculated residential risk-based screening level exceedances for PFOS, PFOA, or PFBS for soil in PRL 11.

Evaluation of groundwater data compared to screening criteria indicates an exceedance of the EPA HA (70 ng/L) in MW-POR11-01 for PFOS and PFOA (combined), with a result of 31,800 ng/L. This location had the highest PFOA concentration at Portland ANGB.

Based on the SI results, the following DQOs are recommended for PRL 11:

- Additional surface and subsurface soil samples to determine if a previously undetected source area exists that is contributing to the groundwater exceedances; and

- Additional investigation to determine the nature and extent of PFOS/PFOA in groundwater (both laterally and vertically), through sampling of additional new monitoring wells located both upgradient of and downgradient from PRL 11.

6.1.10 PFOS/PFOA Contamination Near Installation Boundary

Samples from four monitoring wells (MW-POR07-01, MW-POR08-01, MW-POR10-01, MW-POR11-01) and three surface water samples (POR10-SW1, POR10-SW2, POR10-SW3) were collected to evaluate the PFOS/PFOA contamination near the Installation boundary (Figure 6). MW-POR08-01 and MW-POR11-01 are associated with PRLs located immediately outside and adjacent to the Base boundary and thus were included in assessing migration of PFOS/PFOA compounds offsite. All six PFOS/PFOA compounds were detected in the groundwater samples collected adjacent (both onsite and offsite) to the Installation boundary. All six PFOS/PFOA compounds were also detected in the surface water samples collected within the Installation boundary. The screening results indicate the consistent presence of PFOS and PFOA at concentrations exceeding the 70-ng/L EPA drinking water HA (EPA 2016a). The second highest maximum combined concentration of PFOS and PFOA occurred in the well at PRL 11 (MW-POR11-01), located upgradient of the PRLs within the Installation. PFBS concentrations did not exceed the RSL at any of the groundwater or surface water sample locations. No screening criteria exist for PFHxS, PFHpA, or PFNA. The SI results indicate PFOS/PFOA compounds have potentially migrated offsite given their presence and magnitude at the Installation boundary and at PRL 8 (located downgradient from the PRLs).

6.2 SUMMARY AND RECOMMENDATIONS

In summary, additional investigations are recommended for soil and groundwater at PRLs 2, 3, 4, 5, 6, 7, 8, 10, and 11 and surface water/sediment at PRLs 5, 7, and 10. The recommendations are summarized in Table 9 and described briefly below:

- Further investigation at all nine PRLs is necessary to determine the nature and extent of PFOS/PFOA contamination due to detectable levels at all PRLs.

- Develop an expanded conceptual site model that considers localized groundwater and surface water flow paths to select future sampling locations.

- Complete the delineation of nature and extent of PFAS as part of an Expanded SI or an RI that could consist of:

    - Additional soil and sediment sampling and analysis of an expanded list of PFAS constituents (in addition to the six UCMR3 constituents) to determine if significant source areas related to precursor substances are present. Precursor substances have been demonstrated to oxidize into PFOS and PFOA, and thus could provide a lingering source of these compounds to soil and groundwater.

    - Expanded groundwater sampling program (including analysis of an expanded list of PFAS constituents) to complete horizontal and vertical delineation of the PFOS/PFOA impacts. Further groundwater investigation at the Base boundary is recommended due to the presence of PFOS/PFOA in groundwater above their respective screening criteria.

    - The installation and sampling of upgradient and downgradient off-Base monitoring wells to better define the upgradient source of PFOS/PFOA as well as impacts of PFOS/PFOA that have migrated off Base.

    - The sampling of upgradient and downgradient off-Base surface water and sediment (including analysis of an expanded list of PFAS constituents) to better determine if there is an upgradient source of PFOS/PFOA, as well as impacts of PFOS/PFOA in surface water that have migrated off Base.

- Conduct preliminary site-specific risk assessment calculations in order to identify chemicals of potential concern (COPCs) in every medium and establish preliminary remedial goals for screening purposes.

DQOs are proposed based on the results of the SI and are presented in Table 9. In general, additional samples are required at each PRL in order to establish the nature and extent of PFOA/PFOS constituents for each applicable medium and determine if a complete receptor pathway exists. For soil, additional samples are proposed to determine if a source area exists and, if so, the vertical and horizontal extent for both the vadose and saturated zones. Additional surface water and sediment samples should be collected at PRLs 5, 7, and 10 to further evaluate PFOS/PFOA concentrations in surface water and sediment. As part of the conceptual site model, future investigations also will consider potential groundwater-to-surface water migration, including preferential migration of groundwater contaminants to surface water via subsurface utilities.

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No.	Potential AFFF PRL	Rationale	Recommendation
1	Base Supply – Building 170	The station has stored AFFF at this location for at least the past 10 years. According to Base personnel, no AFFF was spilled in the building.	NFA
2	New Fire Department – Building 180	Fire Department personnel indicated that minor spills occurred during filling the vehicles over the years from onsite containers and minor leaks from the equipment. In addition, at least three occurrences of AFFF being discharged to the stormwater sewer system were documented in the Annual Stormwater Reports.	Proceed to SI. Focus on groundwater.
3	Hangar 250	Minor leaks of AFFF have occurred in the mechanical room. No records of inadvertent releases in the hangar exist; however, if releases did occur, they may have potentially impacted the adjacent ramp.	Proceed to SI. Focus on soil and groundwater at the downgradient edges of the ramp based on surface drainage patterns.
4	Hangar 255	Minor leaks of AFFF have occurred in the mechanical room, with one inadvertent release in the main hangar. Most of the inadvertent release of AFFF likely was hosed off into the trench drain that connects to the sanitary sewer systems, with some of the AFFF making its way onto the ramp and then into the storm sewer system.	Proceed to SI. Focus on soil and groundwater at the downgradient edges of the ramp based on surface drainage patterns.
5	Old Fire Department and Swale – Building 290	Fire Department personnel indicated that minor spills occurred during filling the vehicles over the years from onsite containers and minor leaks from the equipment. In addition, at least one occurrence of AFFF being discharged to the stormwater sewer system is documented in the Annual Stormwater Reports. Reports of AFFF making its way to the drainage swale also have been documented.	Proceed to SI. Focus on soil, sediment, surface water, and groundwater.
6	Hangar 310	Minor leaks of AFFF have occurred in the mechanical room, with an inadvertent release in the main hangar. Most of the inadvertent release of AFFF likely was hosed off into the trench drain that connects to the sanitary sewer systems, with some of the AFFF making its way onto the ramp and then into the storm sewer system.	Proceed to SI. Focus on soil and groundwater at the downgradient edges of the ramp based on surface drainage patterns.
7	Hangar 380	AFFF was stored in fire suppression equipment in the mechanical room of Hangar 380. The fire suppression system's tanks are no longer present and were reportedly removed in 2005. No known discharges occurred in the room or in the main hangar; however, if releases did occur, they may have potentially impacted the adjacent ramp.	Proceed to SI. Focus on soil and groundwater at the downgradient edges of the ramp based on surface drainage patterns.
8	Hangar 375	Minor leaks of AFFF have occurred in the mechanical room, with an inadvertent release in the main hangar. Most of the inadvertent release of AFFF likely was hosed off into the trench drain that connects to the sanitary sewer systems, with some of the AFFF making its way onto the ramp and then into the storm sewer system.	Proceed to SI. Focus on soil and groundwater at the downgradient edges of the ramp based on surface drainage patterns.

Table 1. Preliminary Assessment Report Summary and Recommendations (continued)

No.	Potential AFFF PRL	Rationale	Recommendation
9	POL Storage – Building 431	This building formerly contained the AFFF system tank that provided fire protection for the fuel tanks.	Proceed to SI. Focus on soil and groundwater.
10	Ponds/Stormwater Retention Basins	These two ponds receive 95% of the Base's stormwater discharges. All of the previously aforementioned releases to the stormwater system eventually made their way to these two ponds.	Proceed to SI. Focus on sediment, surface water, and groundwater.

Note: During the September 2017 SI kickoff meeting site visit, stakeholder discussions resulted in deviation from the PA with respect to the PRLs being evaluated in the SI. It was determined that investigation at the POL Storage – Building 431 (PRL 9) would be replaced with investigation at the former IRP Site 7 Burn Pit (designated as PRL 11 in the SI WP).

AFFF = Aqueous film-forming foam.
IRP = Installation Restoration Program.
NFA = No further action.
PA = Preliminary assessment.
SI = Site investigation.
POL = Petroleum, oils, and lubricants.
PRL = Potential release point.
WP = Work Plan.

Table 2. PFOS/PFOA SI Screening Criteria

Parameter	Chemical Abstract Service Number	EPA RSL for Tap Water[a] (ng/L)	EPA Health Advisory[b] (ng/L)	Residential Risk-based Soil Screening Level[c] (µg/kg)
PFOS	1763-23-1	NA	70.0[d]	1,260
PFOA	335-67-1	NA		1,260
PFBS	375-73-5	400,000[e]	NA	1,260,000

[a] EPA RSL for tap water, May 2018.
[b] *Drinking Water Health Advisory for Perfluorooctanoic Acid* (EPA 2016b) and *Drinking Water Health Advisory for Perfluorooctane Sulfonate* (EPA 2016a).
[c] Residential risk-based soil screening levels determined by using the EPA RSL calculator (https://epa-prgs.ornl.gov/cgi-bin/chemicals/csl_search) and the May 2018 EPA RSL tables (https://epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2018) for soil and sediment.
[d] When PFOA and PFOS are both present, the combined detected concentrations of the compounds are compared with the 70-ng/L health advisory value.
[e] PFBS analytical results for groundwater and surface water have been compared to the tap water screening levels.

µg/kg = Micrograms per kilogram.
EPA = U.S. Environmental Protection Agency.
NA = Not available.
ng/L = Nanograms per liter.
PFBS = Perfluorobutane sulfonate.
PFOA = Perfluorooctanoic acid.
PFOS = Perfluorooctane sulfonate.
RSL = Regional screening level.
SI = Site inspection.

Table 3. Summary of SI Activities

PRL Name	Analyzed Parameters[a]	Soil Borings	Soil Samples	Groundwater Samples	Surface Water Samples	Sediment Samples
2: New Fire Department – Building 180	PFOS/PFOA	2	4	2	NA	NA
3: Hangar 250	PFOS/PFOA	2	4	0[b]	NA	NA
4: Hangar 255	PFOS/PFOA	3	6	1	NA	NA
5: Old Fire Department and Swale – Building 290	PFOS/PFOA	3	6	1	NA	1
6: Hangar 310	PFOS/PFOA	2	4	1	NA	NA
7: Hangar 380	PFOS/PFOA	2	4	1	1	1
8: Hangar 375	PFOS/PFOA	2	4	1	NA	NA
10: Ponds/Stormwater Retention Basins	PFOS/PFOA	0	2[c]	1	5	5
11: Former IRP Site 7 Burn Pit	PFOS/PFOA	3	6	1	NA	NA

Notes:
-Two samples will be collected per boring—one from 0 to 2 ft BGS, and the second from the interval immediately above the water table. Actual depth of the subsurface sample will be the 2-ft interval above groundwater table.
-Field duplicates are not included in the sample quantities.
-Groundwater sampling also will include monitoring of field parameters: water level, pH, temperature, conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity.
[a] PFOS/PFOA is used generically in this Site Inspection Work Plan to include the following six 2012 third Unregulated Contaminant Monitoring Rule emerging contaminants: PFOS, PFOA, PFBS, perfluorononanoic acid, perfluoroheptanoic acid, and perfluorohexanesulfonate. All samples will be analyzed for PFOS/PFOA using U.S. Environmental Protection Agency, Method 537, revision 1.1.
[b] Groundwater from PRL 3 is evaluated by co-located groundwater sample from PRL 4.
[c] Soil samples from PRL 10 were collected while installing monitoring well MW-PRL10-01.

BGS = Below ground surface.
IRP = Installation Restoration Program.
NA = Not applicable.
PFBS = Perfluorobutane sulfonate.
PFOA = Perfluorooctanoic acid.
PFOS = Perfluorooctane sulfonate.
PRL = Potential release location.
SI = Site Inspection.

Table 4. Well Construction Details for Portland ANGB SI

Monitoring Well	Top of Casing Elevation (ft ANAVD88)	Ground Elevation (ft ANAVD88)	Screened Interval (ft BGS)	Total Well Depth (ft BTOC)	Well Diameter (in.)	Casing
PRL 2						
MW-POR02-01	18.06	18.22	5.0 – 15.0	15.50	2	PVC
MW-POR02-02	19.09	19.67	5.0 – 15.0	15.50	2	PVC
PRL 4						
MW-POR04-01	20.27	20.48	5.0 – 15.0	15.50	2	PVC
PRL 5						
MW-POR05-01	17.03	17.24	5.0 – 15.0	15.50	2	PVC
PRL 6						
MW-POR06-01	19.22	19.44	5.0 – 15.0	15.50	2	PVC
PRL 7						
MW-POR07-01	20.82	21.02	5.0 – 15.0	15.50	2	PVC
PRL 8						
MW-POR08-01	19.79	20.13	5.0 – 15.0	15.50	2	PVC

Table 4. Well Construction Details for Portland ANGB SI (continued)

Monitoring Well	Top of Casing Elevation (ft ANAVD88)	Ground Elevation (ft ANAVD88)	Screened Interval (ft BGS)	Total Well Depth (ft BTOC)	Well Diameter (in.)	Casing
PRL 10						
MW-POR10-01	21.78	22.08	5.0 – 15.0	15.50	2	PVC
PRL 11						
MW-POR11-01	28.73	28.86	5.0 – 15.0	15.50	2	PVC

Source: Top of casing elevation and ground surface elevation data for the new wells are from the monitoring well survey on May 31, 2018, by Statewide Land Surveying Inc. (see Appendix C). Screened interval, total depth, and well diameter data in this table were obtained from the well construction diagrams provided in Appendix A.
ANADV88 = Above North American Vertical Datum of 1988.
ANGB = Air National Guard Base.
BGS = Below ground surface.
BTOC = Below top of casing.
PRL = Potential release location.
PVC = Polyvinyl chloride.
SI = Site inspection.

Table 5. Water Level Measurements

Monitoring Well Identifier	TOC Elevation (ft ANADV88)	Screened Interval	May 2018	
			Depth to Water (ft BTOC)	Groundwater Elevation (ft ANADV88)
MW-POR02-01	18.06	5.0 – 15.0	5.20	12.86
MW-POR02-02	19.09	5.0 – 15.0	6.48	12.61
MW-POR04-01	20.27	5.0 – 15.0	5.29	14.98
MW-POR05-01	17.03	5.0 – 15.0	3.98	13.05
MW-POR06-01	19.22	5.0 – 15.0	4.34	14.88
MW-POR07-01	20.82	5.0 – 15.0	6.85	13.97
MW-POR08-01	19.79	5.0 – 15.0	7.07	12.72
MW-POR10-01	21.78	5.0 – 15.0	12.63	9.15
MW-POR11-01	28.73	5.0 – 15.0	8.18	20.55

Source: Top of casing elevation data for the new wells are from the monitoring well survey on May 31, 2018, by Statewide Land Surveying Inc. (See Appendix C). Screened interval data were obtained from the well construction diagrams provided in Appendix A. Depth to water data were obtained from groundwater sampling logs provided in Appendix B.

ANADV88 = Above North American Vertical Datum of 1988.
BTOC = Below top of casing.
TOC = Top of casing.

Table 6. Water Quality Parameters

Parameter	Groundwater								
	MW-POR02-01	MW-POR02-02	MW-POR04-01	MW-POR05-01	MW-POR06-01	MW-POR07-01	MW-POR08-01	MW-POR10-01	MW-POR11-01
Dissolved oxygen (mg/L)	3.64	3.48	0.78	1.62	1.81	1.04	4.94	0.38	1.74
ORP (mV)	118.3	32.6	0.8	-56.8	-35.2	-124.3	-78.9	251.7	-10.4
pH (S.U.)	6.69	6.89	6.39	7.17	6.58	7.06	7.80	5.41	6.22
Conductivity (mS/cm)	206	275	675	247	129	346	537	134	1073
Temperature (°C)	17.32	14.36	17.38	14.95	16.26	13.98	14.26	13.11	15.04
Turbidity (NTU)	17.5	25.2	14.4	9.8	23.4	48.2	20.4	20.3	23.6

Parameter	Surface Water					
	POR07-SW1-01	POR10-SW1-01	POR10-SW2-01	POR10-SW3-01	POR10-SW4-01	POR10-SW5-01
Dissolved oxygen (mg/L)	15.76	3.21	0.52	6.68	8.34	1.70
ORP (mV)	40.1	17.1	-35.4	-38.5	7.9	-2.8
pH (S.U.)	7.07	6.58	6.65	6.68	6.79	6.72
Conductivity (mS/cm)	135	232	241	243	262	245
Temperature (°C)	17.65	16.98	21.75	21.78	15.85	13.48
Turbidity (NTU)	60.1	138	38.7	40.9	33.2	38.7

°C = Degrees Celsius.
mg/L = Milligrams per liter.
mS/cm = MicroSiemens per centimeter.
mV = Millivolt.
NTU = Nephelometric turbidity unit.
ORP = Oxidation-reduction potential.
S.U. = Standard unit.

Table 7. Summary of Soil and Sediment Analytical Results

					Analyte	Perfluorooctane Sulfonate (PFOS)	Perfluorooctanoic Acid (PFOA)	Perfluorobutane Sulfonate (PFBS)	Perfluoroheptanoic Acid (PFHpA)	Perfluorohexane Sulfonate (PFHxS)	Perfluorononanoic Acid (PFNA)
					Screening Level[a]	1,260	1,260	1,260,000	NA	NA	NA
PRL	Location	Sample Identifier	Sample Date	Sample Depth (ft)	Sample Type	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)
Soil											
2	POR02-SB1	POR02-SB1-01	5/23/18	0-2	REG	**0.4 J**	**1.2**	**0.52 J**	**0.22 J**	**1.4**	0.27 U
	POR02-SB1	POR02-SB1-01D	5/23/18	0-2	DUP	**0.27 J**	0.22 U	0.2 U	0.22 U	0.071 U	0.22 U
	POR02-SB1	POR02-SB1-02	5/23/18	6-8	REG	**18**	**0.37 J**	0.23 U	**0.18 J**	**0.55**	0.26 U
	POR02-SB2	POR02-SB2-01	5/25/18	0-2	REG	**34 J**	**0.23 J**	**0.08 J**	0.24 U	**1.2**	0.24 U
	POR02-SB2	POR02-SB2-02	5/25/18	5.5-7.5	REG	**14**	**0.5**	**0.24 J**	**0.34 J**	**1.1**	0.26 U
3	POR03-SB1	POR03-SB1-01	5/22/18	0-2	REG	**0.34 J**	0.21 U	0.19 U	0.21 U	**0.12 J**	0.21 U
	POR03-SB1	POR03-SB1-02	5/22/18	5-7	REG	0.63 U	0.25 U	0.23 U	0.25 U	0.25 U	0.25 U
	POR03-SB1	POR03-SB1-02D	5/22/18	5-7	DUP	0.64 U	0.26 U	0.23 U	0.26 U	0.26 U	0.26 U
	POR03-SB2	POR03-SB2-01	5/22/18	0-2	REG	**0.73 J**	0.23 U	0.21 U	0.23 U	**0.16 J**	0.23 U
	POR03-SB2	POR03-SB2-02	5/22/18	5.5-7.5	REG	**0.36 J**	0.26 U	0.23 U	0.26 U	**0.17 J**	0.26 U
4	POR04-SB1	POR04-SB1-01	5/25/18	1.5-3.5	REG	**160 J**	**0.89**	**0.73**	**0.21 J**	**6.7**	0.27 U
	POR04-SB1	POR04-SB1-02	5/25/18	7-9	REG	**89 J**	**0.39 J**	**0.42 J**	**0.14 J**	**2.3**	0.28 U
	POR04-SB2	POR04-SB2-01	5/23/18	.5-2.5	REG	0.63 U	0.25 U	0.23 U	0.25 U	0.25 U	0.25 U
	POR04-SB2	POR04-SB2-02	5/23/18	10-12	REG	0.7 U	0.28 U	0.25 U	0.28 U	0.28 U	0.28 U
	POR04-SB3	POR04-SB3-01	5/22/18	0-2	REG	0.63 U	0.25 U	0.23 U	0.25 U	0.25 U	0.25 U
	POR04-SB3	POR04-SB3-02	5/22/18	6-8	REG	0.66 U	0.27 U	0.24 U	0.27 U	0.27 U	0.27 U
5	POR05-SB1	POR05-SB1-01	5/22/18	0-2	REG	**100 J**	**0.42**	**0.35 J**	**0.35 J**	**3.4**	**0.13 J**
	POR05-SB1	POR05-SB1-01D	5/22/18	0-2	DUP	**86 J**	**0.45**	**0.62**	**0.43**	**3.7**	**0.11 J**
	POR05-SB1	POR05-SB1-02	5/22/18	6-8	REG	**22**	**0.3 J**	**0.12 J**	**0.18 J**	**1.3**	0.27 U
	POR05-SB2	POR05-SB2-01	5/22/18	0-2	REG	**12**	**0.21 J**	0.19 U	0.21 U	**0.62**	0.21 U
	POR05-SB2	POR05-SB2-02	5/22/18	11-13	REG	**2.9**	0.27 U	0.25 U	0.27 U	**0.32 J**	0.27 U
	POR05-SB3	POR05-SB3-01	5/22/18	0-2	REG	**16**	**0.34 J**	**0.075 J**	**0.25 J**	**1.8**	**0.13 J**
	POR05-SB3	POR05-SB3-02	5/22/18	5-7	REG	**2.6**	0.22 U	0.19 U	0.22 U	**0.52**	0.22 U

PRL	Location	Sample Identifier	Sample Date	Sample Depth (ft)	Sample Type	Perfluorooctane Sulfonate (PFOS)	Perfluorooctanoic Acid (PFOA)	Perfluorobutane Sulfonate (PFBS)	Perfluoroheptanoic Acid (PFHpA)	Perfluorohexane Sulfonate (PFHxS)	Perfluorononanoic Acid (PFNA)
		Analyte				Perfluorooctane Sulfonate (PFOS)	Perfluorooctanoic Acid (PFOA)	Perfluorobutane Sulfonate (PFBS)	Perfluoroheptanoic Acid (PFHpA)	Perfluorohexane Sulfonate (PFHxS)	Perfluorononanoic Acid (PFNA)
		Screening Level[a]				1,260	1,260	1,260,000	NA	NA	NA
						(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg)	(µg/kg
6	POR06-SB1	POR06-SB1-01	5/22/18	0-2	REG	**11**	**0.14 J**	0.19 U	0.22 U	**0.51**	0.22 U
	POR06-SB1	POR06-SB1-02	5/22/18	2-4	REG	**8.7**	0.21 U	0.19 U	0.21 U	**0.24 J**	0.21 U
	POR06-SB2	POR06-SB2-01	5/22/18	0-2	REG	**8.8**	0.2 U	0.18 U	0.2 U	**0.34**	0.2 U
	POR06-SB2	POR06-SB2-02	5/22/18	2-4	REG	**2.7**	0.22 U	0.19 U	0.22 U	**0.13 J**	0.22 U
7	POR07-SB1	POR07-SB1-01	5/22/18	0-2	REG	**7**	**0.18 J**	0.19 U	0.21 U	**0.25 J**	**0.12 J**
	POR07-SB1	POR07-SB1-02	5/22/18	5.5-7.5	REG	**2.5**	0.22 U	0.2 U	0.22 U	**0.082 J**	0.22 U
	POR07-SB2	POR07-SB2-01	5/22/18	0-2	REG	0.55 U	0.22 U	**0.63**	**0.25 J**	**0.26 J**	0.22 U
	POR07-SB2	POR07-SB2-01	5/22/18	6-8	REG	**1.4**	**0.28 J**	**0.25 J**	**0.2 J**	**0.26 J**	0.21 U
8	POR08-SB1	POR08-SB1-01	5/24/18	0-2	REG	**6.1 J**	0.2 U	0.18 U	0.2 U	0.2 U	0.2 U
	POR08-SB1	POR08-SB1-02	5/24/18	5-7	REG	**3.3**	0.21 U	0.19 U	0.21 U	0.21 U	0.21 U
	POR08-SB1	POR08-SB1-02D	5/24/18	5-7	DUP	**3**	0.21 U	0.19 U	0.21 U	0.21 U	0.21 U
	POR08-SB2	POR08-SB2-01	5/24/18	0-2	REG	**0.31 J**	0.21 U	0.18 U	0.21 U	**0.093 J**	0.21 U
	POR08-SB2	POR08-SB2-02	5/24/18	4.5-6.5	REG	**20**	0.22 U	0.2 U	0.22 U	**0.19 J**	0.22 U
10	MWPOR10-SB1	MWPOR10-SB1-01	5/23/18	0-2	REG	**6.8**	**0.14 J**	**0.077 J**	0.21 U	**0.46**	0.21 U
	MWPOR10-SB1	MWPOR10-SB1-02	5/23/18	6-8	REG	**1.3**	0.22 U	0.2 U	0.22 U	**0.09 J**	0.22 U
11	POR11-SB1	POR11-SB1-01	5/23/18	0-2	REG	**20**	**27**	0.2 U	**0.22 J**	**0.81**	0.23 U
	POR11-SB1	POR11-SB1-02	5/23/18	11-13	REG	**17**	**23**	**0.14 J**	**0.29 J**	**19**	**0.23 J**
	POR11-SB2	POR11-SB2-01	5/23/18	0.5-2.5	REG	**30 J**	**3.1**	**0.19 J**	**0.34**	**13**	0.23 U
	POR11-SB2	POR11-SB2-02	5/23/18	12-14	REG	**5**	**31 J**	**0.27 J**	**0.71**	**17**	0.25 U
	POR11-SB2	POR11-SB2-02D	5/23/18	12-14	DUP	**6.7**	**25 J**	**0.32 J**	**0.75**	**18**	0.24 U
	POR11-SB3	POR11-SB3-01	5/23/18	0.5-2.5	REG	**1100 J**	**10**	**0.87**	**1.7**	**33 J**	**0.81 J**
	POR11-SB3	POR11-SB3-02	5/23/18	11-13	REG	**1.1 J**	**7.2**	**1.9**	**5**	**16**	0.25 U

Table 7. Summary of Soil and Sediment Analytical Results (continued)

PRL	Location	Sample Identifier	Sample Date	Sample Depth (ft)	Sample Type	Perfluorooctane Sulfonate (PFOS) (µg/kg)	Perfluorooctanoic Acid (PFOA) (µg/kg)	Perfluorobutane Sulfonate (PFBS) (µg/kg)	Perfluoroheptanoic Acid (PFHpA) (µg/kg)	Perfluorohexane Sulfonate (PFHxS) (µg/kg)	Perfluorononanoic Acid (PFNA) (µg/kg)
				Analyte		Perfluorooctane Sulfonate (PFOS)	Perfluorooctanoic Acid (PFOA)	Perfluorobutane Sulfonate (PFBS)	Perfluoroheptanoic Acid (PFHpA)	Perfluorohexane Sulfonate (PFHxS)	Perfluorononanoic Acid (PFNA)
				Screening Level[a]		1,260	1,260	1,260,000	NA	NA	NA
					Sediment						
5	POR05-SD1	POR05-SD1-01	5/24/18	Surface	REG	**210 J**	**1.7**	**0.86 J**	**0.68 J**	**34**	**0.72 J**
7	POR07-SD1	POR07-SD1-01	5/29/18	Surface	REG	**1800 J**	**50**	**12**	**6.6 J**	**100**	**16**
10	POR10-SD1	POR10-SD1-01	5/23/18	Surface	REG	**19**	**0.23 J**	**0.11 J**	0.29 U	**1.1**	0.29 U
	POR10-SD2	POR10-SD2-01	5/23/18	Surface	REG	**18**	**0.18 J**	0.28 U	0.32 U	**0.96**	0.32 U
	POR10-SD3	POR10-SD3-01	5/23/18	Surface	REG	**68**	**0.7 J**	**0.35 J**	0.81 U	**4**	0.81 U
	POR10-SD4	POR10-SD4-01	5/29/18	Surface	REG	**85**	**1.3 J**	**0.63 J**	1.4 U	**6.6**	1.4 U
	POR10-SD5	POR10-SD5-01	5/31/18	Surface	REG	**22**	**0.49 J**	0.8 U	0.89 U	**1.6**	0.89 U

[a] U.S. Environmental Protection Agency (EPA) residential risk-based soil screening level determined using the EPA regional screening level (RSL) calculator and May 2018 EPA RSL tables.

Bold denotes detected concentration.
Bold highlighted denotes concentration that exceeds screening criteria.

µg/kg = Micrograms per kilogram.
DUP = Duplicate.
NA = Not applicable.
PRL = Potential release location.
REG = Regular.

Data Qualifiers:
J = Estimated concentration.
U = Chemical not detected above the laboratory detection limit.

Table 8. Summary of Groundwater and Surface Water Analytical Results

PRL	Location	Sample Identifier	Sample Date	Sample Depth (ft)	Sample Type	Perfluorooctane Sulfonate (PFOS) (ng/L)	Perfluorooctanoic Acid (PFOA) (ng/L)	PFOS+PFOA (ng/L)	Perfluorobutane Sulfonate (PFBS) (ng/L)	Perfluoroheptanoic Acid (PFHpA) (ng/L)	Perfluorohexane Sulfonate (PFHxS) (ng/L)	Perfluorononanoic Acid (PFNA) (ng/L)
Analyte						Perfluorooctane Sulfonate (PFOS)	Perfluorooctanoic Acid (PFOA)	PFOS+PFOA	Perfluorobutane Sulfonate (PFBS)	Perfluoroheptanoic Acid (PFHpA)	Perfluorohexane Sulfonate (PFHxS)	Perfluorononanoic Acid (PFNA)
Health Advisory[a]						70	70	70	NA	NA	NA	NA
EPA RSL Tap Water[b]						NA	NA	NA	NA	NA	NA	400,000
Groundwater												
2	MW-POR02-01	MW-POR02-01-01	5/31/18	10.0	REG	**42000 J**	**970 J**	**42970 J**	**260**	**350**	**1800 J**	**43 J**
	MW-POR02-02	MW-POR02-02-01	5/31/18	10.0	REG	**2100 J**	**560 J**	**2660 J**	**430 J**	**390 J**	**2100 J**	**19**
4	MW-POR04-01	MW-POR04-01-01	5/31/18	10.0	REG	**220**	**53**	**273**	**6.3**	**22**	**36**	**12**
5	MW-POR05-01	MW-POR05-01-01	5/29/18	10.0	REG	**2300 J**	**40**	**2340 J**	**40**	**13**	**600 J**	**0.87 J**
6	MW-POR06-01	MW-POR06-01-01	5/29/18	10.0	REG	**690 J**	**30**	**720 J**	**19**	**9.4**	**1400 J**	**3**
7	MW-POR07-01	MW-POR07-01-01	5/29/18	10.0	REG	**310**	**45**	**355**	**8.8**	**14**	**53**	**11**
8	MW-POR08-01	MW-POR08-01-01	5/31/18	10.0	REG	**370**	**180**	**550**	**19**	**11**	**260**	**2.8**
10	MW-POR10-01	MW-POR10-01-01	5/31/18	10.0	REG	**160 J**	**12 J**	**172 J**	**42 J**	**5.8 J**	**630 J**	**2 J**
11	MW-POR11-01	MW-POR11-01-01	5/31/18	10.0	REG	**7800 J**	**24000 J**	**31800 J**	**300**	**400 J**	**11000 J**	**9.4**
Surface Water												
7	POR07-SW1	POR07-SW1-01	5/29/18	Surface	REG	**3000 J**	**360**	**3360 J**	**97**	**89**	**870 J**	**87**
10	POR10-SW1	POR10-SW1-01	5/23/18	Surface	REG	**1500 J**	**63**	**1563 J**	**110**	**38**	**570 J**	**4**
	POR10-SW2	POR10-SW2-01	5/23/18	Surface	REG	**1000 J**	**52**	**1052 J**	**79**	**30**	**460 J**	**3.9**
	POR10-SW3	POR10-SW3-01	5/23/18	Surface	REG	**1700 J**	**44**	**1744 J**	**61**	**27**	**390 J**	**6.8**
	POR10-SW4	POR10-SW4-01	5/29/18	Surface	REG	**1500 J**	**95 J**	**1595 J**	**140 J**	**53 J**	**790 J**	**5.3 J**
	POR10-SW5	POR10-SW5-01	5/31/18	Surface	REG	**1500 J**	**64**	**1564 J**	**81**	**35**	**450 J**	**4.1**

[a] May 2016 EPA health advisory for PFOS/PFOA combined.
[b] May 2018 EPA RSL for tap water.
Bold denotes detected concentration.
Bold highlighted denotes concentration that exceeds screening criteria.

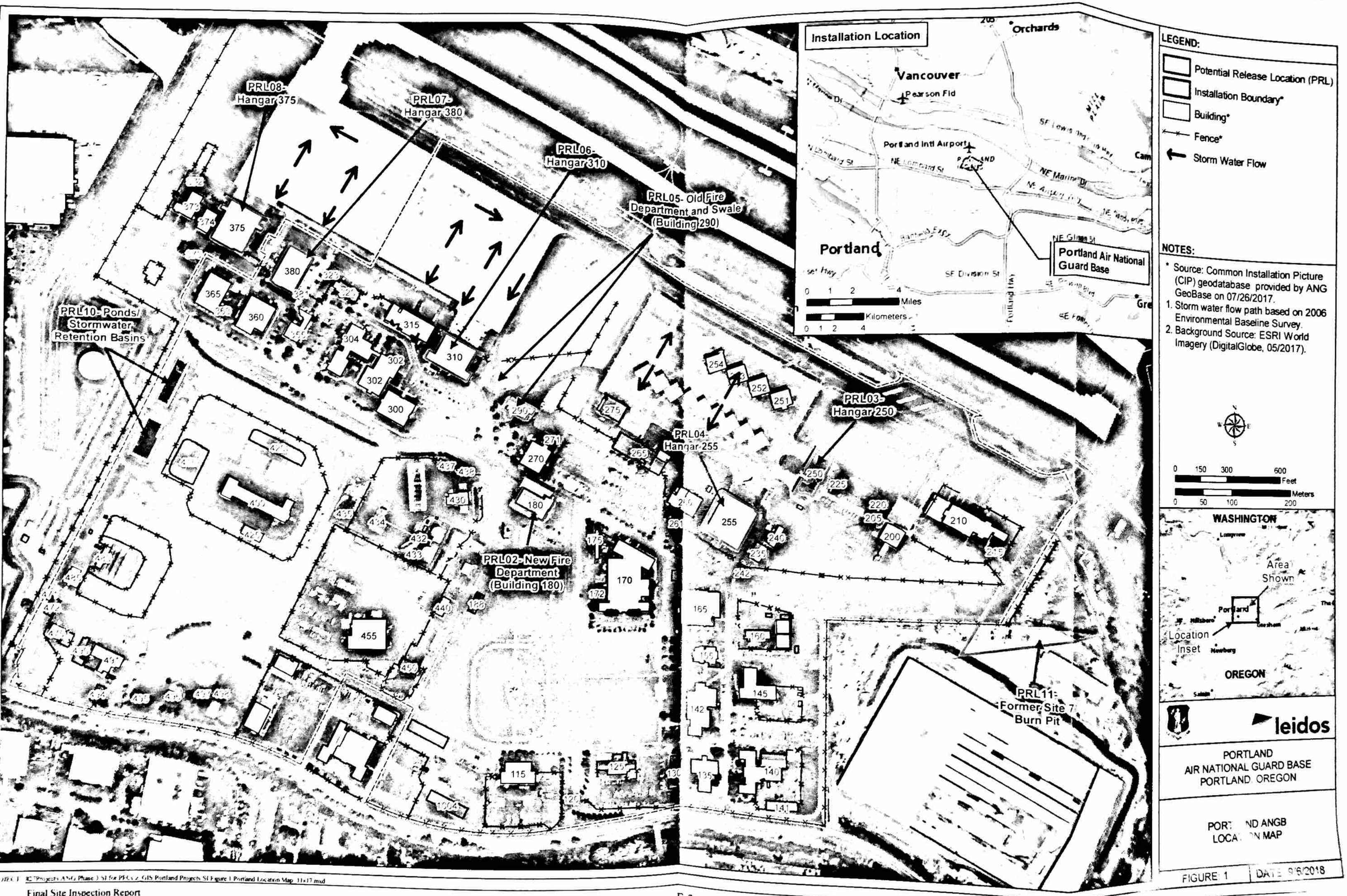
EPA = U.S. Environmental Protection Agency.
NA = Not applicable.
ng/L = Nanograms per liter.
PRL = Potential release location.
REG = Regular.
RSL = Regional screening level.

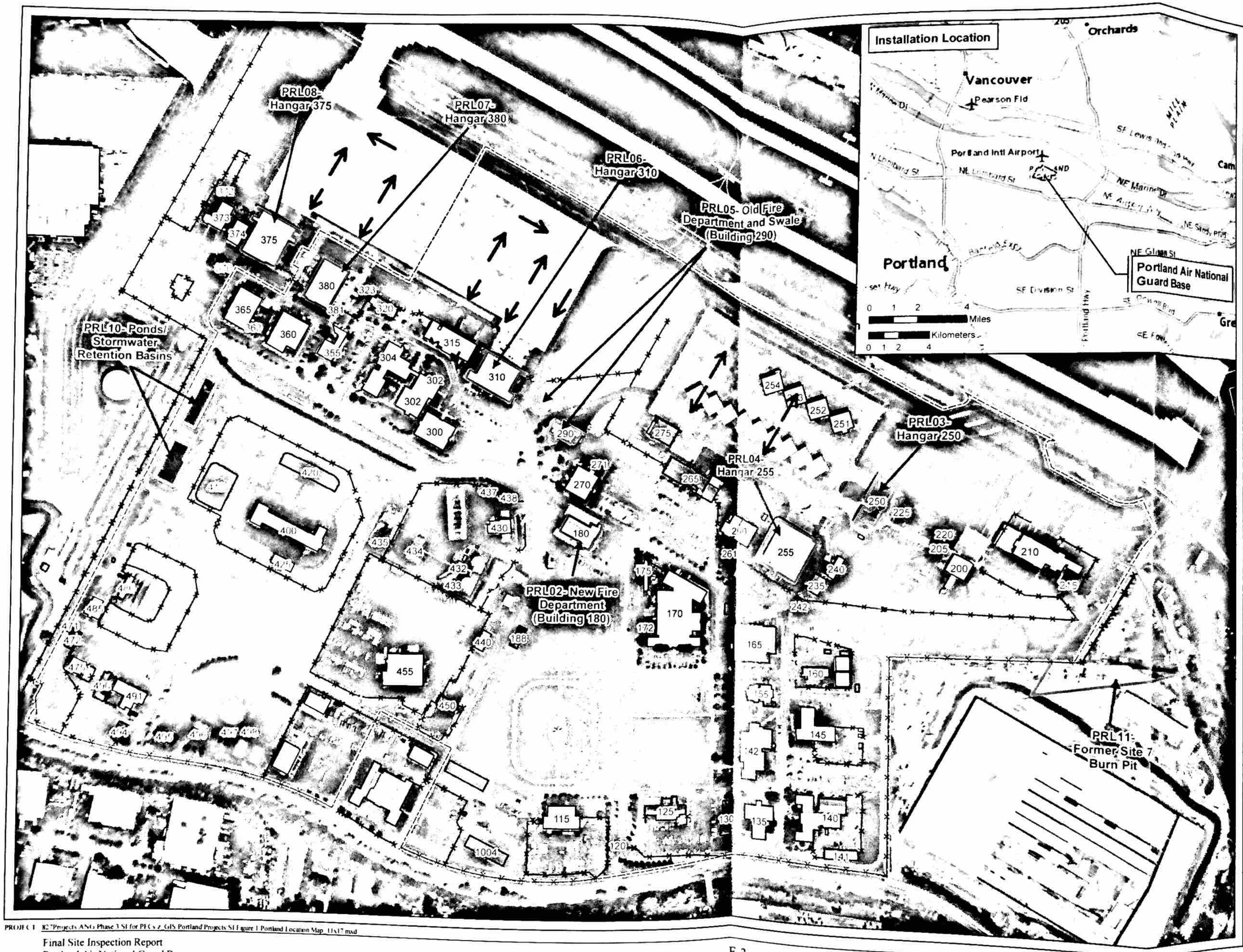
Data Qualifiers:
J = Estimated concentration.
U = Chemical not detected above the laboratory detection limit.

Table 9. SI Recommendation Summary Table

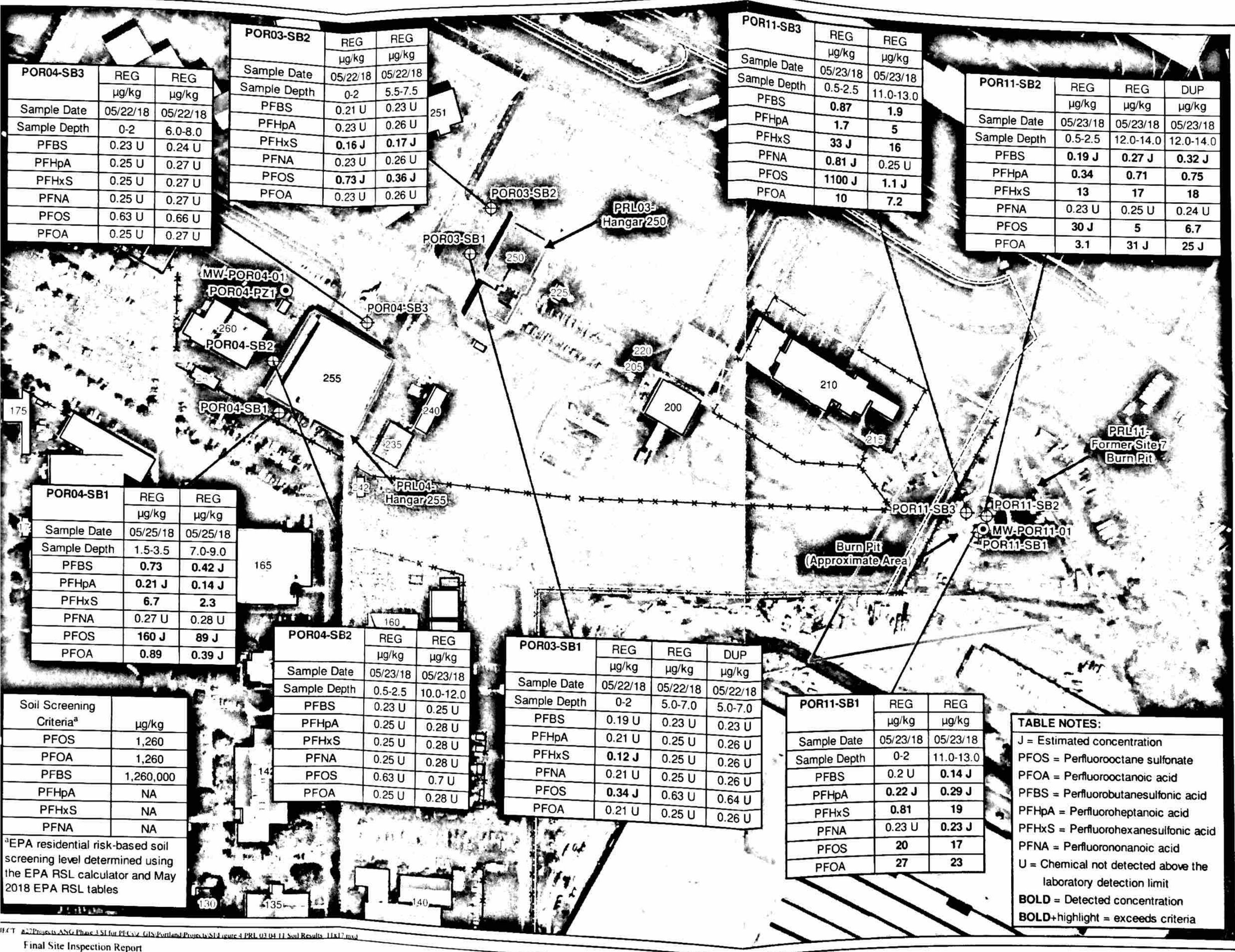
PRL No.	PRL Description	Constituents Above Screening Criteria	Sampling Recommendations and Objectives
2	New Fire Department – Building 180	**Groundwater:** PFOS + PFOA	**Soil:** Although screening criteria were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
3	Hangar 250	**Groundwater:** PFOS + PFOA	**Soil:** Although screening criteria were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
4	Hangar 255	**Groundwater:** PFOS + PFOA	**Soil:** Although screening criteria were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
5	Old Fire Department and Swale – Building 290	**Groundwater**: PFOS + PFOA	**Soil:** Although screening criteria were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells. **Surface Water and Sediment**: Determine PFOS/PFOA impact to sediment and surface water through additional sampling of surface water and sediment at the drainage swale.
6	Hangar 310	**Groundwater:** PFOS + PFOA	**Soil:** Although screening criteria were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
7	Hangar 380	**Groundwater:** PFOS + PFOA **Surface Water:** PFOS + PFOA **Sediment:** PFOS	**Soil:** Although screening criteria were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells. **Surface Water and Sediment**: Determine PFOS/PFOA impact to sediment and surface water through additional upgradient sampling of surface water and sediment and evaluate potential downgradient impacts.

PRL No.	PRL Description	Constituents Above Screening Criteria	Sampling Recommendations and Objectives
8	Hangar 375	**Groundwater:** PFOS + PFOA	**Soil:** Although screening criteria were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
10	Ponds/Stormwater Retention Basins	**Groundwater:** PFOS + PFOA **Surface water:** PFOS + PFOA	**Soil:** Although screening criteria were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells. **Surface Water and Sediment**: Determine PFOS/PFOA impact to surface water through additional upgradient sampling of surface water and sediment and evaluate potential downgradient impacts.
11	Former IRP Site 7 Burn Pit	**Groundwater:** PFOS + PFOA	**Soil:** Although screening criteria were not exceeded, additional surface and subsurface soil samples are proposed to determine if an unidentified source exists and if so, to determine the nature and extent in the vertical and horizontal directions given the potential for soil to groundwater migration. **Groundwater:** Determine the nature and extent both vertically and horizontally through the sampling of existing and additional new monitoring wells.
	General		**Soil:** Collect additional surface and subsurface soil samples to determine the nature and extent both vertically and horizontally of PFOS/PFOA contamination. Analyze for an expanded list of PFOS/PFOA compounds to evaluate for potential precursor compounds. **Groundwater:** (1) Collect additional groundwater samples in upgradient locations to quantify potential impacts from upgradient sources; (2) collect additional groundwater samples off Base through the installation of a limited number of new monitoring wells to determine if PFAS impacts beyond the Base boundary are increasing or decreasing. **Surface Water/Sediment:** (1) Collect additional surface water and sediment samples in upgradient locations to quantify potential impacts from upgradient sources; (2) collect additional surface water and sediment samples from downgradient locations and off Base to determine PFAS impacts beyond the Base boundary.


PRL08- Hangar 375
PRL07- Hangar 380
PRL06- Hangar 310
PRL05- Old Fire Department and Swale (Building 290)
PRL10- Ponds/ Stormwater Retention Basins
PRL04- Hangar 255
PRL03- Hangar 250
PRL02- New Fire Department (Building 180)
PRL11- Former Site 7 Burn Pit
Installation Location
Vancouver
Pearson Fld
Portland Intl Airport
Portland
Orchards
Portland Air National Guard Base
0 1 2 4 Miles
0 1 2 4 Kilometers
LEGEND:
Potential Release Location (PRL)
Installation Boundary*
Building*
Fence*
Storm Water Flow
NOTES:
* Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 07/26/2017.
1. Storm water flow path based on 2006 Environmental Baseline Survey.
2. Background Source: ESRI World Imagery (DigitalGlobe, 05/2017).
0 150 300 600 Feet
0 50 100 200 Meters
WASHINGTON
Area Shown
Location Inset
OREGON
leidos
PORTLAND
AIR NATIONAL GUARD BASE
PORTLAND, OREGON
PORTLAND ANGB
LOCATION MAP
FIGURE 1
DATE 9/6/2018



PROJECT I:\Projects\ANG\Phase 3 SI for PECs\2_GIS\Portland\Projects\SI Figure 1 Portland Location Map_11x17.mxd



POR04-SB3	REG	REG
	µg/kg	µg/kg
Sample Date	05/22/18	05/22/18
Sample Depth	0-2	6.0-8.0
PFBS	0.23 U	0.24 U
PFHpA	0.25 U	0.27 U
PFHxS	0.25 U	0.27 U
PFNA	0.25 U	0.27 U
PFOS	0.63 U	0.66 U
PFOA	0.25 U	0.27 U

POR03-SB2	REG	REG
	µg/kg	µg/kg
Sample Date	05/22/18	05/22/18
Sample Depth	0-2	5.5-7.5
PFBS	0.21 U	0.23 U
PFHpA	0.23 U	0.26 U
PFHxS	**0.16 J**	**0.17 J**
PFNA	0.23 U	0.26 U
PFOS	**0.73 J**	**0.36 J**
PFOA	0.23 U	0.26 U

POR11-SB3	REG	REG
	µg/kg	µg/kg
Sample Date	05/23/18	05/23/18
Sample Depth	0.5-2.5	11.0-13.0
PFBS	**0.87**	**1.9**
PFHpA	**1.7**	**5**
PFHxS	**33 J**	**16**
PFNA	**0.81 J**	0.25 U
PFOS	**1100 J**	**1.1 J**
PFOA	**10**	**7.2**

POR11-SB2	REG	REG	DUP
	µg/kg	µg/kg	µg/kg
Sample Date	05/23/18	05/23/18	05/23/18
Sample Depth	0.5-2.5	12.0-14.0	12.0-14.0
PFBS	**0.19 J**	**0.27 J**	**0.32 J**
PFHpA	**0.34**	**0.71**	**0.75**
PFHxS	**13**	**17**	**18**
PFNA	0.23 U	0.25 U	0.24 U
PFOS	**30 J**	**5**	**6.7**
PFOA	**3.1**	**31 J**	**25 J**

POR04-SB1	REG	REG
	µg/kg	µg/kg
Sample Date	05/25/18	05/25/18
Sample Depth	1.5-3.5	7.0-9.0
PFBS	**0.73**	**0.42 J**
PFHpA	**0.21 J**	**0.14 J**
PFHxS	**6.7**	**2.3**
PFNA	0.27 U	0.28 U
PFOS	**160 J**	**89 J**
PFOA	**0.89**	**0.39 J**

POR04-SB2	REG	REG
	µg/kg	µg/kg
Sample Date	05/23/18	05/23/18
Sample Depth	0.5-2.5	10.0-12.0
PFBS	0.23 U	0.25 U
PFHpA	0.25 U	0.28 U
PFHxS	0.25 U	0.28 U
PFNA	0.25 U	0.28 U
PFOS	0.63 U	0.7 U
PFOA	0.25 U	0.28 U

POR03-SB1	REG	REG	DUP
	µg/kg	µg/kg	µg/kg
Sample Date	05/22/18	05/22/18	05/22/18
Sample Depth	0-2	5.0-7.0	5.0-7.0
PFBS	0.19 U	0.23 U	0.23 U
PFHpA	0.21 U	0.25 U	0.26 U
PFHxS	**0.12 J**	0.25 U	0.26 U
PFNA	0.21 U	0.25 U	0.26 U
PFOS	**0.34 J**	0.63 U	0.64 U
PFOA	0.21 U	0.25 U	0.26 U

POR11-SB1	REG	REG
	µg/kg	µg/kg
Sample Date	05/23/18	05/23/18
Sample Depth	0-2	11.0-13.0
PFBS	0.2 U	**0.14 J**
PFHpA	**0.22 J**	**0.29 J**
PFHxS	**0.81**	**19**
PFNA	0.23 U	**0.23 J**
PFOS	**20**	**17**
PFOA	**27**	**23**

Soil Screening Criteria[a]	µg/kg
PFOS	1,260
PFOA	1,260
PFBS	1,260,000
PFHpA	NA
PFHxS	NA
PFNA	NA

[a]EPA residential risk-based soil screening level determined using the EPA RSL calculator and May 2018 EPA RSL tables

LEGEND:

- SI Monitoring Well
- Soil Boring
- Temporary Piezometer
- Potential Release Location (PRL)
- Site Feature
- Installation Boundary*
- Building*
- Fence*

POR03-SB1 Location Identifier

NOTES:

* Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 07/26/2017.

1. Background Source: ESRI World Imagery (DigitalGlobe, 05/2017).

0 50 100 200 Feet

0 20 40 80 Meters

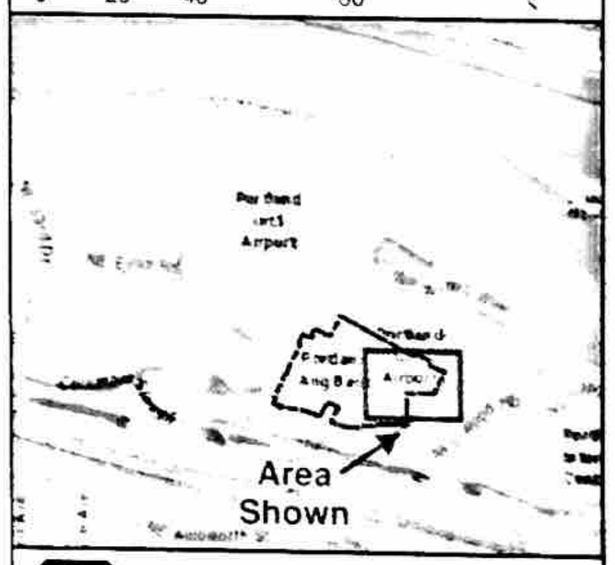


TABLE NOTES:

J = Estimated concentration
PFOS = Perfluorooctane sulfonate
PFOA = Perfluorooctanoic acid
PFBS = Perfluorobutanesulfonic acid
PFHpA = Perfluoroheptanoic acid
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
U = Chemical not detected above the laboratory detection limit
BOLD = Detected concentration
BOLD+highlight = exceeds criteria

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PRLs 3, 4, AND 11 SI
SOIL ANALYTICAL RESULTS

FIGURE: 4 | DATE: 9/6/2018

PRL08-Hangar 375
MW-POR08-01
POR08-SB1
POR08-SB2
MW-POR07-01
POR07-SB1
PRL07-Hangar 380
POR07-SW1
POR07-SB2
POR07-SD1
PRL06-Hangar 310
MW-POR06-01
POR06-SB1
POR06-SB2
PRL05- Old Fire Department and Swale (Building 290)
MW-POR05-01
POR05-SD1
POR05-SB3
POR05-SB2
POR05-SB1
PRL10- Ponds/ Stormwater Retention Basins
POR10-SW1
POR10-SD1
POR10-SD5
POR10-SW5
POR10-SD2
POR10-SW2
POR10-SD3
POR10-SW3
MW-POR10-01
POR10-SW4
POR10-SD4
MW-POR02-02
POR02-SB2
POR02-SB1
MW-POR02-01
PRL02- New Fire Department (Building 180)
PRL03-Hangar 250
POR03-SB2
POR03-SB1
MW-POR04-01
POR04-PZ1
POR04-SB3
POR04-SB2
POR04-SB1
PRL04-Hangar 255
POR11-SB3
POR11-SB2
POR11-SB1
PRL11-Former Site 7 Burn Pit
Burn Pit (Approximate Area)
LEGEND:
SI Monitoring Well
Soil Boring
Surface Water Sample
Sediment Sample
Temporary Piezometer
Site Feature
Potential Release Location (PRL)
Installation Boundary*
Building*
Fence*
Inferred Regional Groundwater Flow
Storm Water Flow
POR03-SB1 Location Identifier
NOTES:
* Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 07/26/2017.
1. Storm water flow path based on 2006 Environmental Baseline Survey.
2. The general groundwater flow direction was inferred using historical and 2018 SI water level measurements.
3. Background Source: ESRI World Imagery (DigitalGlobe, 05/2017).
0 150 300 600 Feet
0 25 50 100 Meters
Portland Intl Airport
Portland ANG Base
Area Shown
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PORTLAND, OREGON
PORTLAND ANGB
SI SAMPLING OVERVIEW MAP
FIGURE: 2
DATE: 9/6/2018

TABLE NOTES:

J = Estimated concentration
PFOS = Perfluorooctane sulfonate
PFOA = Perfluorooctanoic acid
PFBS = Perfluorobutanesulfonic acid
PFHpA = Perfluoroheptanoic acid
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
U = Chemical not detected above the laboratory detection limit
BOLD = Detected concentration
BOLD+highlight = exceeds criteria

POR06-SB1	REG	REG
	µg/kg	µg/kg
Sample Date	05/22/18	05/22/18
Sample Depth	0-2	2.0-4.0
PFBS	0.19 U	0.19 U
PFHpA	0.22 U	0.21 U
PFHxS	**0.51**	**0.24 J**
PFNA	0.22 U	0.21 U
PFOS	**11**	**8.7**
PFOA	**0.14 J**	0.21 U

POR06-SB2	REG	REG
	µg/kg	µg/kg
Sample Date	05/22/18	05/22/18
Sample Depth	0-2	2.0-4.0
PFBS	0.18 U	0.19 U
PFHpA	0.2 U	0.22 U
PFHxS	**0.34**	**0.13 J**
PFNA	0.2 U	0.22 U
PFOS	**8.8**	**2.7**
PFOA	0.2 U	0.22 U

POR05-SB3	REG	REG
	µg/kg	µg/kg
Sample Date	05/22/18	05/22/18
Sample Depth	0-2	5.0-7.0
PFBS	**0.075 J**	0.19 U
PFHpA	**0.25 J**	0.22 U
PFHxS	**1.8**	**0.52**
PFNA	**0.13 J**	0.22 U
PFOS	**16**	**2.6**
PFOA	**0.34 J**	0.22 U

POR05-SB1	REG	DUP	REG
	µg/kg	µg/kg	µg/kg
Sample Date	05/22/18	05/22/18	05/22/18
Sample Depth	0-2	0-2	6.0-8.0
PFBS	**0.35 J**	**0.62**	**0.12 J**
PFHpA	**0.35 J**	**0.43**	**0.18 J**
PFHxS	**3.4**	**3.7**	**1.3**
PFNA	**0.13 J**	**0.11 J**	0.27 U
PFOS	**100 J**	**86 J**	**22**
PFOA	**0.42**	**0.45**	**0.3 J**

POR05-SD1	REG
	µg/kg
Sample Date	05/24/18
Sample Depth	surface
PFBS	**0.86 J**
PFHpA	**0.68 J**
PFHxS	**34**
PFNA	**0.72 J**
PFOS	**210 J**
PFOA	**1.7**

POR05-SB2	REG	REG
	µg/kg	µg/kg
Sample Date	05/22/18	05/22/18
Sample Depth	0-2	11.0-13.0
PFBS	0.19 U	0.25 U
PFHpA	0.21 U	0.27 U
PFHxS	**0.62**	**0.32 J**
PFNA	0.21 U	0.27 U
PFOS	**12**	**2.9**
PFOA	**0.21 J**	0.27 U

POR02-SB2	REG	REG
	µg/kg	µg/kg
Sample Date	5/25/18.	5/25/18.
Sample Depth	0-2	5.5-7.5
PFBS	**0.08 J**	**0.24 J**
PFHpA	0.24 U	**0.34 J**
PFHxS	**1.2**	**1.1**
PFNA	0.24 U	0.26 U
PFOS	**34 J**	**14**
PFOA	**0.23 J**	**0.5**

POR02-SB1	REG	DUP	REG
	µg/kg	µg/kg	µg/kg
Sample Date	05/23/18	05/23/18	05/23/18
Sample Depth	0-2	0-2	6.0-8.0
PFBS	**0.52 J**	0.2 U	0.23 U
PFHpA	**0.22 J**	0.22 U	**0.18 J**
PFHxS	**1.4**	0.071 U	**0.55**
PFNA	0.27 U	0.22 U	0.26 U
PFOS	**0.4 J**	**0.27 J**	**18**
PFOA	**1.2**	0.22 U	**0.37 J**

Soil Screening Criteria[a]	µg/kg
PFOS	1,260
PFOA	1,260
PFBS	1,260,000
PFHpA	NA
PFHxS	NA
PFNA	NA

[a]EPA residential risk-based soil screening level determined using the EPA RSL calculator and May 2018 EPA RSL tables

MW-POR06-01
POR06-SB1
PRL06-Hangar 310
POR06-SB2
MW-POR05-01
POR05-SB3
POR05-SD1
POR05-SB1
POR05-SB2
MW-POR02-02
POR02-SB2
POR02-SB1
MW-POR02-01
PRL05-Old Fire Department and Swale (Building 290)
PRL02-New Fire Department (Building 180)
304
310
302
300
290
420
400
435
434
437
438
271
270
180
254
255
26
188

LEGEND:

- SI Monitoring Well
- Soil Boring
- Sediment Sample
- Potential Release Location (PRL)
- Installation Boundary*
- Building*
- Fence*

POR02-SB1 Location Identifier

NOTES:

* Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 07/26/2017.
1. Background Source: ESRI World Imagery (DigitalGlobe, 05/2017).

0 50 100 200 Feet
0 20 40 60 Meters

Area Shown

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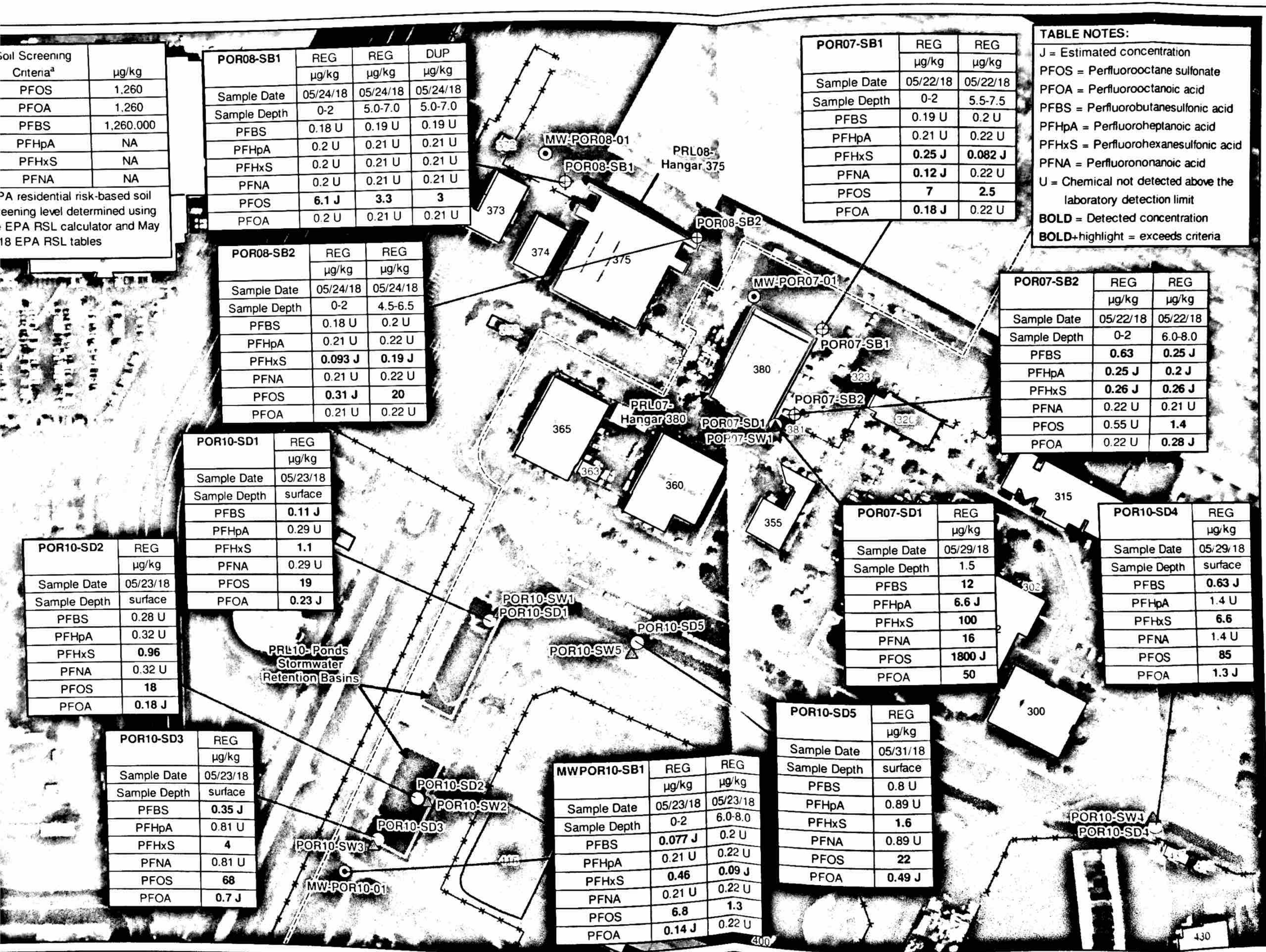
PRLs 2, 5, AND 6
SI SOIL AND SEDIMENT
ANALYTICAL RESULTS

FIGURE: 3 | DATE: 3/6/2019

January 2019

OJECT: 827Projects\ANG Phase 3 SI for PFCs\e_GIS\Portland\Projects\SI\Figure 3 PRL 02 05 06 Soil Sediment Results 11x17.mxd



Soil Screening Criteria[a]	µg/kg
PFOS	1,260
PFOA	1,260
PFBS	1,260,000
PFHpA	NA
PFHxS	NA
PFNA	NA

PA residential risk-based soil eening level determined using EPA RSL calculator and May 18 EPA RSL tables

POR08-SB1	REG	REG	DUP
	µg/kg	µg/kg	µg/kg
Sample Date	05/24/18	05/24/18	05/24/18
Sample Depth	0-2	5.0-7.0	5.0-7.0
PFBS	0.18 U	0.19 U	0.19 U
PFHpA	0.2 U	0.21 U	0.21 U
PFHxS	0.2 U	0.21 U	0.21 U
PFNA	0.2 U	0.21 U	0.21 U
PFOS	**6.1 J**	**3.3**	**3**
PFOA	0.2 U	0.21 U	0.21 U

POR08-SB2	REG	REG
	µg/kg	µg/kg
Sample Date	05/24/18	05/24/18
Sample Depth	0-2	4.5-6.5
PFBS	0.18 U	0.2 U
PFHpA	0.21 U	0.22 U
PFHxS	**0.093 J**	**0.19 J**
PFNA	0.21 U	0.22 U
PFOS	**0.31 J**	**20**
PFOA	0.21 U	0.22 U

POR07-SB1	REG	REG
	µg/kg	µg/kg
Sample Date	05/22/18	05/22/18
Sample Depth	0-2	5.5-7.5
PFBS	0.19 U	0.2 U
PFHpA	0.21 U	0.22 U
PFHxS	**0.25 J**	**0.082 J**
PFNA	**0.12 J**	0.22 U
PFOS	**7**	**2.5**
PFOA	**0.18 J**	0.22 U

TABLE NOTES:
J = Estimated concentration
PFOS = Perfluorooctane sulfonate
PFOA = Perfluorooctanoic acid
PFBS = Perfluorobutanesulfonic acid
PFHpA = Perfluoroheptanoic acid
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
U = Chemical not detected above the laboratory detection limit
BOLD = Detected concentration
BOLD+highlight = exceeds criteria

POR07-SB2	REG	REG
	µg/kg	µg/kg
Sample Date	05/22/18	05/22/18
Sample Depth	0-2	6.0-8.0
PFBS	**0.63**	**0.25 J**
PFHpA	**0.25 J**	**0.2 J**
PFHxS	**0.26 J**	**0.26 J**
PFNA	0.22 U	0.21 U
PFOS	0.55 U	**1.4**
PFOA	0.22 U	**0.28 J**

POR10-SD1	REG
	µg/kg
Sample Date	05/23/18
Sample Depth	surface
PFBS	**0.11 J**
PFHpA	0.29 U
PFHxS	**1.1**
PFNA	0.29 U
PFOS	**19**
PFOA	**0.23 J**

POR10-SD2	REG
	µg/kg
Sample Date	05/23/18
Sample Depth	surface
PFBS	0.28 U
PFHpA	0.32 U
PFHxS	**0.96**
PFNA	0.32 U
PFOS	**18**
PFOA	**0.18 J**

POR07-SD1	REG
	µg/kg
Sample Date	05/29/18
Sample Depth	1.5
PFBS	**12**
PFHpA	**6.6 J**
PFHxS	**100**
PFNA	**16**
PFOS	**1800 J**
PFOA	**50**

POR10-SD4	REG
	µg/kg
Sample Date	05/29/18
Sample Depth	surface
PFBS	**0.63 J**
PFHpA	1.4 U
PFHxS	**6.6**
PFNA	1.4 U
PFOS	**85**
PFOA	**1.3 J**

POR10-SD5	REG
	µg/kg
Sample Date	05/31/18
Sample Depth	surface
PFBS	0.8 U
PFHpA	0.89 U
PFHxS	**1.6**
PFNA	0.89 U
PFOS	**22**
PFOA	**0.49 J**

POR10-SD3	REG
	µg/kg
Sample Date	05/23/18
Sample Depth	surface
PFBS	**0.35 J**
PFHpA	0.81 U
PFHxS	**4**
PFNA	0.81 U
PFOS	**68**
PFOA	**0.7 J**

MWPOR10-SB1	REG	REG
	µg/kg	µg/kg
Sample Date	05/23/18	05/23/18
Sample Depth	0-2	6.0-8.0
PFBS	**0.077 J**	0.2 U
PFHpA	0.21 U	0.22 U
PFHxS	**0.46**	**0.09 J**
PFNA	0.21 U	0.22 U
PFOS	**6.8**	**1.3**
PFOA	**0.14 J**	0.22 U

LEGEND:
- SI Monitoring Well
- Soil Boring
- Surface Water Sample
- Sediment Sample
- Potential Release Location (PRL)
- Installation Boundary*
- Building*
- Fence*
- **POR02-SB1** Location Identifier

NOTES:
* Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 07/26/2017.
1. Background Source: ESRI World Imagery (DigitalGlobe, 05/2017).

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PRLs 7, 8, AND 10
SI SOIL AND SEDIMENT
ANALYTICAL RESULTS

FIGURE: 5 | DATE: 9.6.2018

MW-POR08-01-01	REG
	ng/L
Sample Date	05/31/18
Sample Depth	10.0
PFBS	19
PFHpA	11
PFHxS	260
PFNA	2.8
PFOS	370
PFOA	180
PFOS+PFOA	550

POR10-SW1-01	REG
	ng/L
Sample Date	05/23/18
Sample Depth	surface
PFBS	110
PFHpA	38
PFHxS	570 J
PFNA	4
PFOS	1500 J
PFOA	63
PFOS+PFOA	1563 J

MW-POR07-01-01	REG
	ng/L
Sample Date	05/29/18
Sample Depth	10.0
PFBS	8.8
PFHpA	14
PFHxS	53
PFNA	11
PFOS	310
PFOA	45
PFOS+PFOA	355

POR07-SW1-01	REG
	ng/L
Sample Date	05/29/18
Sample Depth	surface
PFBS	97
PFHpA	89
PFHxS	870 J
PFNA	87
PFOS	3000 J
PFOA	360
PFOS+PFOA	3360 J

MW-POR06-01-01	REG
	ng/L
Sample Date	05/29/18
Sample Depth	10.0
PFBS	19
PFHpA	9.4
PFHxS	1400 J
PFNA	3
PFOS	690 J
PFOA	30
PFOS+PFOA	720 J

MW-POR05-01-01	REG
	ng/L
Sample Date	05/29/18
Sample Depth	10.0
PFBS	40
PFHpA	13
PFHxS	600 J
PFNA	0.87 J
PFOS	2300 J
PFOA	40
PFOS+PFOA	2340 J

Groundwater Surface Water Screening Criteria	Health Advisory[a]	Tap water RSL[b]
	ng/L	ng/L
PFOS	70	NA
PFOA	70	NA
PFOS+PFOA	70	NA
PFBS	NA	400,000
PFHpA	NA	NA
PFHxS	NA	NA
PFNA	NA	NA

[a] May 2016 EPA health advisory
[b] May 2018 EPA RSL for Tap Water

MW-POR02-02-01	REG
	ng/L
Sample Date	05/31 18
Sample Depth	10 0
PFBS	430 J
PFHpA	390 J
PFHxS	2100 J
PFNA	19
PFOS	2100 J
PFOA	560 J
PFOS+PFOA	2660 J

MW-POR04-01-01	REG
	ng L
Sample Date	05 31 18
Sample Depth	10 0
PFBS	6.3
PFHpA	22
PFHxS	36
PFNA	12
PFOS	220
PFOA	53
PFOS+PFOA	273

MW-POR11-01-01	REG
	ng L
Sample Date	05 31 18
Sample Depth	10 0
PFBS	300
PFHpA	400 J
PFHxS	11000 J
PFNA	9.4
PFOS	7800 J
PFOA	24000 J
PFOS+PFOA	31800 J

MW-POR10-01-01	REG
	ng/L
Sample Date	05/31/18
Sample Depth	10.0
PFBS	42 J
PFHpA	5.8 J
PFHxS	630 J
PFNA	2 J
PFOS	160 J
PFOA	12 J
PFOS+PFOA	172 J

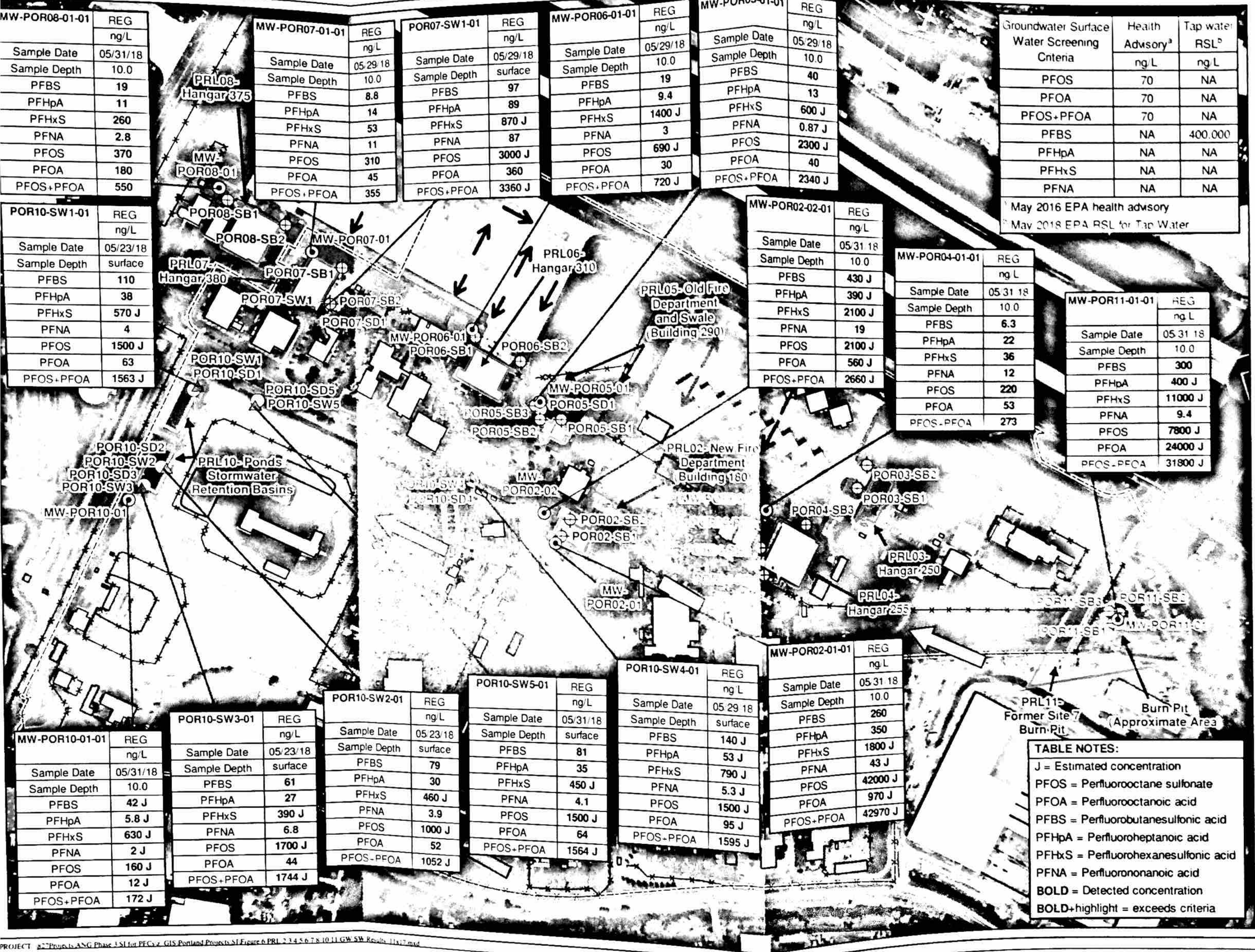
POR10-SW3-01	REG
	ng/L
Sample Date	05/23/18
Sample Depth	surface
PFBS	61
PFHpA	27
PFHxS	390 J
PFNA	6.8
PFOS	1700 J
PFOA	44
PFOS+PFOA	1744 J

POR10-SW2-01	REG
	ng/L
Sample Date	05/23/18
Sample Depth	surface
PFBS	79
PFHpA	30
PFHxS	460 J
PFNA	3.9
PFOS	1000 J
PFOA	52
PFOS+PFOA	1052 J

POR10-SW5-01	REG
	ng/L
Sample Date	05/31/18
Sample Depth	surface
PFBS	81
PFHpA	35
PFHxS	450 J
PFNA	4.1
PFOS	1500 J
PFOA	64
PFOS+PFOA	1564 J

POR10-SW4-01	REG
	ng L
Sample Date	05 29 18
Sample Depth	surface
PFBS	140 J
PFHpA	53 J
PFHxS	790 J
PFNA	5.3 J
PFOS	1500 J
PFOA	95 J
PFOS+PFOA	1595 J

MW-POR02-01-01	REG
	ng L
Sample Date	05 31 18
Sample Depth	10.0
PFBS	260
PFHpA	350
PFHxS	1800 J
PFNA	43 J
PFOS	42000 J
PFOA	970 J
PFOS+PFOA	42970 J



LEGEND:

- SI Monitoring Well
- Soil Boring
- Surface Water Sample
- Sediment Sample
- Temporary Piezometer
- Site Feature
- Potential Release Location (PRL)
- Installation Boundary*
- Building*
- Fence*
- Inferred Regional Groundwater Flow
- Storm Water Flow

POR03-SB1 Location Identifier

NOTES:

* Source: Common Installation Picture (CIP) geodatabase provided by ANG GeoBase on 07 26 2017.

1. Storm water flow path based on 2006 Environmental Baseline Survey
2. The general groundwater flow direction was inferred using historical and 2018 SI water level measurements.
3. Background Source: ESRI World Imagery (DigitalGlobe, 05 2017).

0 150 300 600 Feet
0 25 50 100 Meters

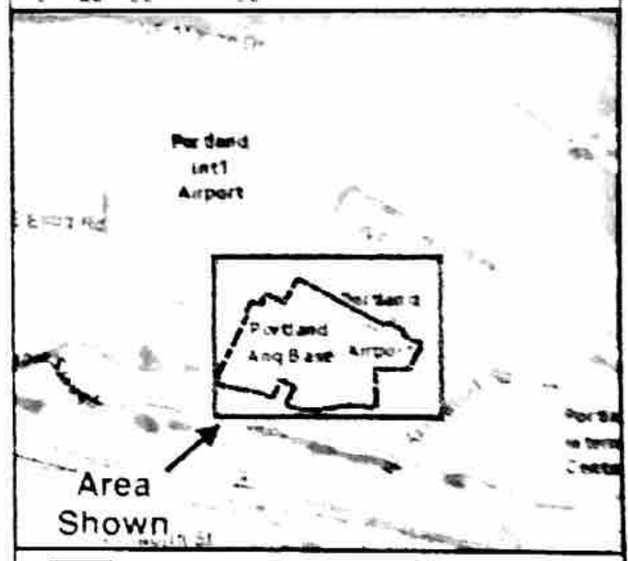


TABLE NOTES:

J = Estimated concentration
PFOS = Perfluorooctane sulfonate
PFOA = Perfluorooctanoic acid
PFBS = Perfluorobutanesulfonic acid
PFHpA = Perfluoroheptanoic acid
PFHxS = Perfluorohexanesulfonic acid
PFNA = Perfluorononanoic acid
BOLD = Detected concentration
BOLD+highlight = exceeds criteria

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PRLs 2, 3, 4, 5, 6, 7, 8, 10, AND 11
SI GROUNDWATER AND
SURFACE WATER
ANALYTICAL RESULTS

FIGURE: 6 | DATE: 9/7 2018

recommendations for potential follow-on actions. References are included in Section 5.0. Representative photos of the subject sites taken during the site visit are attached as Appendix A. Interview questions and records of communication are presented in Appendix B and other supporting documentation is provided in Appendix C.

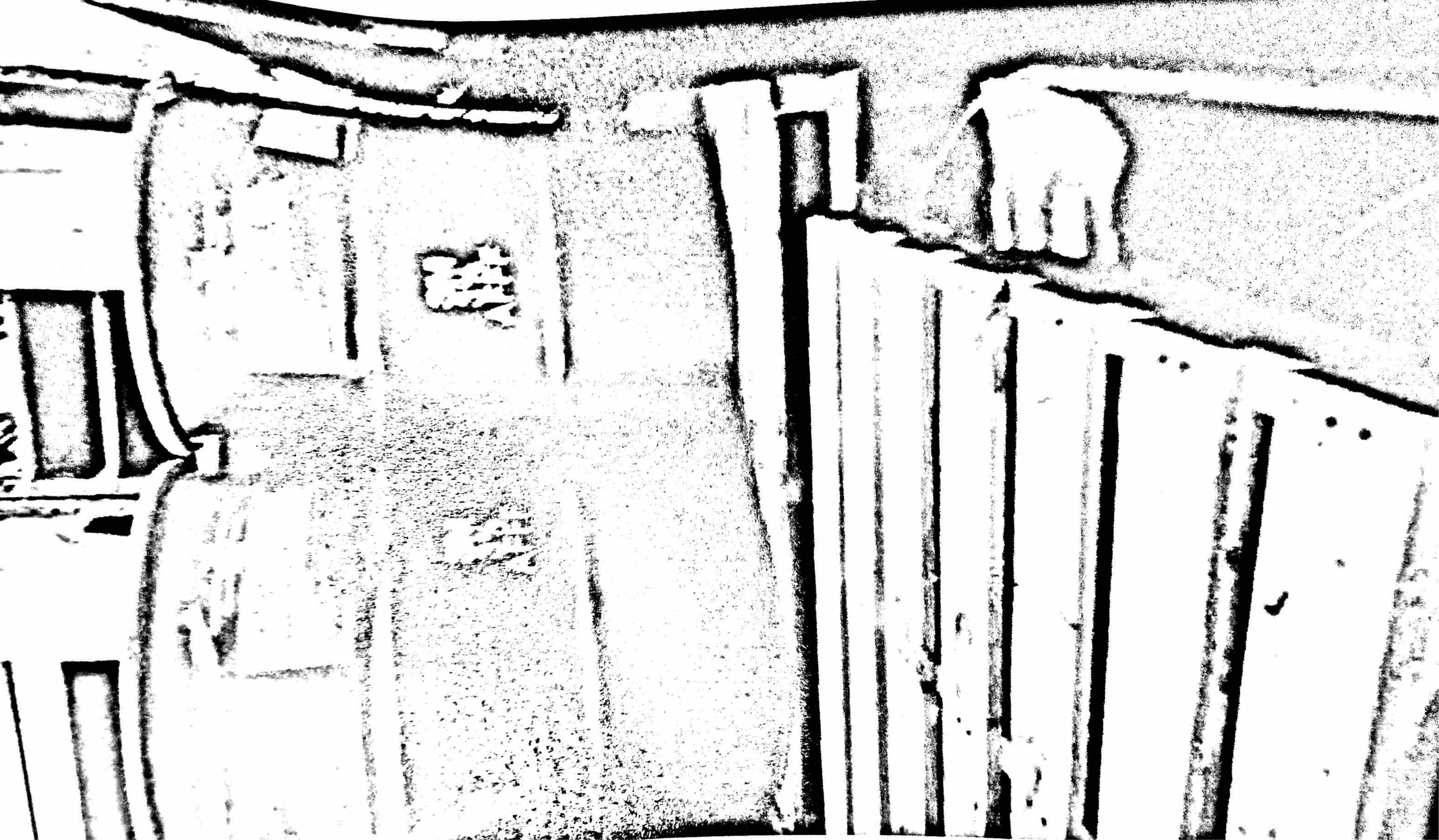
1.1 Hydrogeologic Setting

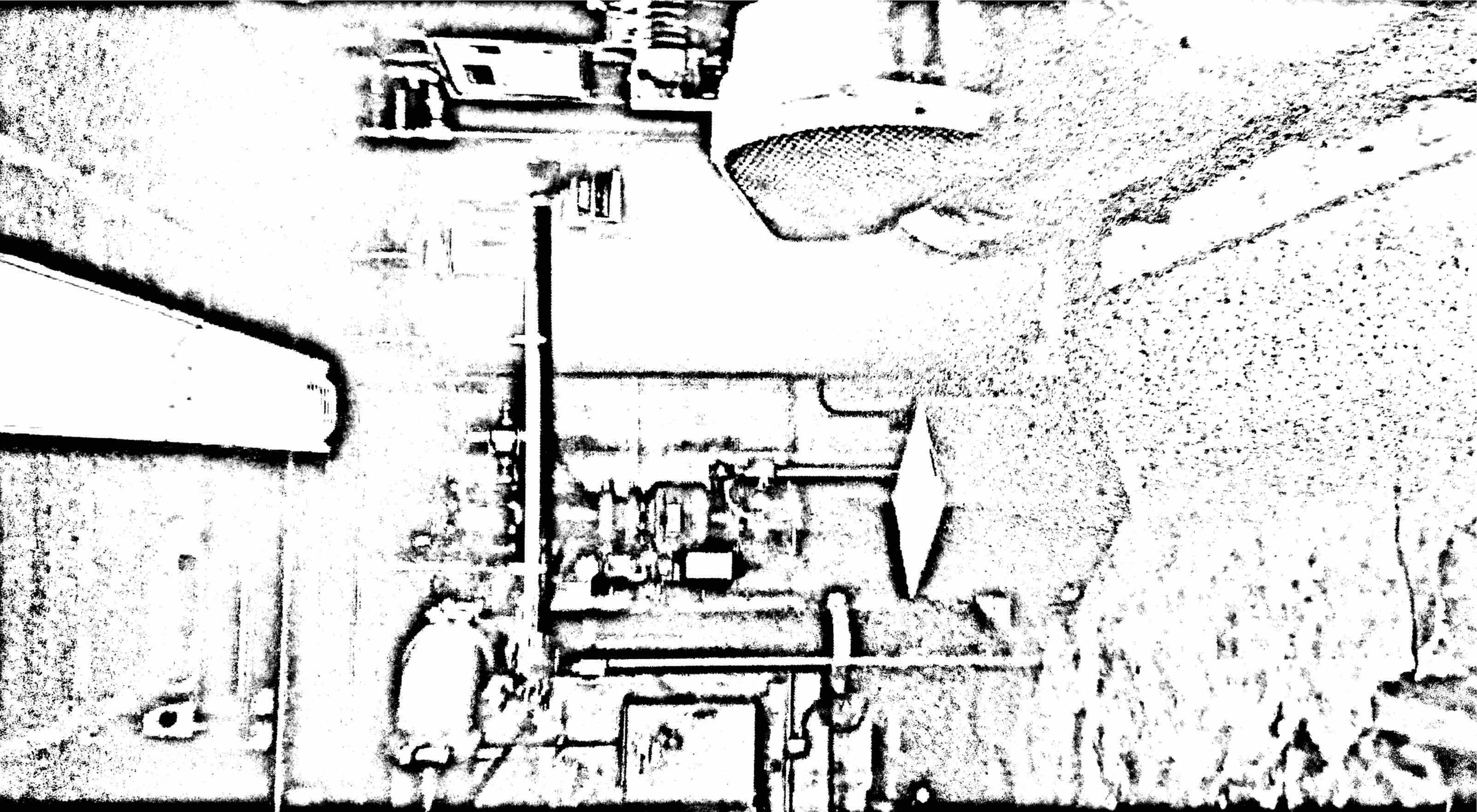
Hydrogeologic information was obtained from the Final Phase II Environmental Baseline Survey (EBS) Site Assessment Report prepared by BEM Systems, Inc. (BEM, 2013). Significant hydrogeologic units are present in the vicinity of PDX. These units include, in descending order, the Overbank Deposits, the Columbia Sand River Aquifer (CRSA), the Troutdale Gravel Aquifer (TGA), Confining Unit 1, the Troutdale Sandstone Aquifer, Confining Unit 2, and the Sand and Gravel Aquifer.

Several hydrogeologic units underlying PDX are part of a regional aquifer system that serves as the City of Portland's supplemental water supply.

The depth to groundwater in wells completed in the Overbank Deposits and the CRSA generally ranges from 2 to 10 feet below ground surface (bgs), depending on location, seasonal influences, and long-term precipitation trends. The inferred groundwater flow direction in the Overbank Deposits is predominantly toward the west and northwest. The groundwater flow direction in the CRSA, indicated by data collected prior to the Phase II Remedial Investigation (RI), was primarily toward the northwest. Water level data collected during a Phase II RI suggests that the groundwater flow direction in the CRSA fluctuates between northeast and south.

Further discussion of area wells is included in Section 3.3.1.1 of this report.





17. Can you describe the procedure on how vehicles and systems are/were supplied with AFFF?

pouring - pump from foam to...

18. Can you provide the procedures on how these vehicles are/were cleaned/decontaminated and where vehicle cleaning is performed currently as well as performed in the past?

auto soap - washed inside.

19. Is/was there a specified area on the installation where vehicles are filled with AFFF and does this area have secondary containment in case of spills?

~~no~~ to Primarily in Fire Station

20. When a release of AFFF occurs during a fire training exercise, now and in the past, how is the AFFF cleaned and disposed of?

at Port

✓(A) - some spilled @ Bldg 290 in swale.

21. How many FTAs are/were on this installation and where are they?

None

22. How many FTAs are active and inactive?

None

23. What types of fuels/flammables were used at the FTAs?

N/A

24. For inactive FTAs, when was the last time that fire training using AFFF was conducted at them? Find out ahead of time in Admin Record for former FTAs.

N/A

see Roger Cox Sheet and sign on for this interview

142nd FW Portland, Or
see interview
26 Aug 2015
0900 HRS

Interview Questions regarding AFFF use
(At Present and back to 1970)

all had AFFF exposure

250
255 - has AFFF late 70's, early 80's
310
380
375
POL

180 - New FD - formerly stored
(290 OLD FD had AFFF)

1. When did AFFF first start being used on this installation?

FD - 20 some years
Mostly 6%

AFFF was on base in 1988 when Roger arrived.

2. What are the years of active use for each Fire Training Area (FTA), Aircraft Hangar, Fire Department, other places AFFF may have been used (collectively Potential Areas of Concern (PAOC)?

NO FTA on base - on Port of Portland property

3. What type of AFFF is used or has been used on this installation (i.e. 3%, 6%, High Expansion Foam)?

Bldg 170
- some stored in
=
They have FFEF - but are not concerned

Mostly some 3%'s

4. What manufacturer's AFFF products are used or were used on this installation (i.e. 3M, Ansul, Chemguard, etc.)?

currently stored @ 170

5. Did you ever dispose of old bulk AFFF, if so, when and where?

Yes, Roger go through DLA. (A) ✓

6. Is the AFFF stored as a mixed solution (3% or 6%) or do you formulate the AFFF on the installation?

see above

7. If AFFF is formulated on base, where is the solution mixed, contained, transferred, etc.?

NO

8. Are your automated fire suppression systems currently charged with AFFF or have they been retrofitted for use of high expansion foam?

250
255
310
} currently

380 used to
375 may have AFFF

9. If retrofitted, when was that done?
- new HEF systems only.
- no retrofitting

10. Do you have an inventory of the amount of AFFF stored on the installation, now and in the past, or present in automated fire suppression systems? Were retention ponds built to store discharged AFFF? Was the AFFF trickled to the sanitary sewer or left in the pond to infiltrate?
Bldg 170 - FD - only on trucks
NO
Testing of systems - Bakertank or Sanitary

11. Provide a list of vehicles that carried AFFF, now and in the past, and where are/were they located? Any vehicles have a history of leaking AFFF?
yes, minimal amount
3 crash trucks — 25 gal " "
1 engine — 50 gal
1 Foam trailer — 2000 gal
(former) P19 - 130 gal
P19 - 250 Chow
(former P19 old crash pol in carries 130)

12. How much AFFF (gallons) is/was carried/stored in the specified vehicles?
see above

13. Do you ever dispose of unused AFFF? If so, how and where?
(A) Yes, Goes through Roger

14. Has unused AFFF ever been disposed of in the past? If so, how and where?
(A) Yes, check w/ Roger

15. Do you/did you test the vehicles spray patterns to make sure equipment is working properly?
Yes, but on Post Property

16. How often are/were these spray tests performed and can you provide the locations of these tests, now and in the past?
annual

25. What are/were the non-FTA locations where PFCs or AFFF release systems are installed (i.e. Hangars, Wastewater Treatment Plants, Fire Stations, etc.)? Where are/were these locations (Building numbers)?

NO

See previous

26. Do you have a list (Building names and numbers, current and demolished) where the fire suppression systems either currently contain or have contained AFFF?

See previous

27. Do you have records of fuel spill logs and emergency response logs? Knowledge of aircraft mishaps/crashes?

Do not use AFFF on Fuel spills.

used on age equip, small issues east apron

28. Do you have recollection or records of AFFF being used as a precaution in response to fuel releases to prevent fires?

No.

29. Do you have recollection or records of historical emergency response sites (i.e. crash sites and fires) where AFFF was used?

On Port Property

30. Do you have recollection or record of emergency runway landings where foam might have been used as a precaution?

No

31. If not written records or incomplete written records, do you have anecdotal/verbal information and locations of spills or other emergency response incidents where AFFF was used?

No.

√ w/ Scott.

142nd Fighter Wing 26 Aug 2015
PFC PA Site Visit (Portland, OR) 0900hrs

Sign in

on base

Roger Rein, Environmental Manager (since 1988)
Harry Dankers, 142 CES/Engineering (since 2003)
Michael Godsey 142FS/Real Property (since 1995)
Fogg Rick M 142 FMS (Dep Chief) (since 2011)
Osborne Nate Fire Lt. (on base since 1997)

32. What is the typical procedure for removing dispensed AFFF from an area where it has been used? - First try to contain it. - Flush into drains - sanitary

33. Can you provide any other locations where AFFF has been stored, released, or used (i.e. hangars, buildings, fire stations, firefighting equipment testing and maintenance areas, emergency response sites, storm water/surface water, waste water treatment plants, and AFFF ponds)? 180 · 290 · 170 · plus hangars

34. Do you have or did you have a chrome plating shop on base? If no, skip to Question #38.

NO

35. What were/are the years of operation of that chrome plating shop?

N/A

36. Do you know whether the shop has/had a foam blanket mist suppression system or used a fume hood for emissions control? N/A

37. If foam blanket mist suppression was used, where was the foam stored, mixed, applied, etc.?

N/A

38. Is there anyone else or other base organization personnel that you would recommend we interview? Name, organization, position, phone number, e-mail.

(A) J w/him tomorrow → (A) John LeCarno ~~alarm~~ technician

39. Was it common practice to wash away fuel spills with AFFF?

NO

40. Identify drainage patterns around flightline/ramp area. Point source discharge is likely AFFF Area of Concern (AOC).

See Drwgs

& City of Portland well field is east of the base - see Fig 1-2 in 2006 EBS

142nd FW
Portland, OR 26 Aug 2015

Meeting Notes

Thomas Albright, Base Plumber (at base, since 1999)
- AFFF still in Bldg 375 (going to Port @ end of year)
- All 300 Bldgs are former AFRC, left in 2008. Flying presence

- Bldg 170 - storage of AFFF
- Bldg 250 - currently has AFFF
- " 255 - has AFFF
- " 290 - had AFFF
- " 310 - has AFFF - weapons release + munitions trng
- " 380 - former AFRC - had AFFF - d.1 2005
- " 375 - " " - has AFFF in system

142nd FW 8/27/2015

+Portland, OR-

(Discussion w/ Roger Rein)

Testing of AFFF systems was done w/ water (& sometimes had to collect in a Baker tanks) + often discharged into sanitary sewer

AFFF is profile #130

130B is not AFFF

Records of AFFF leaving base

- shipped out to DRMO (or DLA)
- Roger sent email to me w/ records (2008 to present)
  - had electronic records back to 2008
  - prior to 2008, hardcopies are available
  - Roger arrived @ base in 1988

-went through archived paper files, found several examples of AFFF Disposal through DRMO.

142nd FW
Portland, OR

26 Aug 2015

Aviva Johnston - @ base since 2001
Nat. Resource ~~E~~ Specialist II

- ~~Ever~~ All sanitary lines (Mains) were replaced in 2013 South of ~~2013~~ O Comm (those which were in bad shape)

- Northern Sanitary lines were inspected via camera and were found to be in Good condition. This is where AFFF discharges took (hangar, FD, etc.)

- Aviva wrote reports on Annual SW about detail AFFF discharge incidents - we have copies

1412nd FW
Portland, Oregon 27 Aug 2015

John LeCarno, Electrician, been @ base 23/24 years.

John took me around to view AFFF sys in different Hangar

✓ 250 Hangars - AFFF - tank present not contents 55 gals / marked 200 gal design capacity
minor leaks in room, no inadvertant releases to J.his knowledge

✓ 255 Hangar - AFFF present, 600 gallons on placard on tank
* hanger had inadvertant release onto ramp tank mfrd 1994, minor leaks in rooms

✓ 310 Hangar - AFFF still present, minor leaks in room, 3 tanks, could not find volume
(similar to 375 - no markings)
* Hangar had inadvertant release, went onto ramp, tank mfr 1987

✓ 380 Hangar - AFFF tanks gone, No recollection of discharge

✓ 375 Hangar (to be turned over to Port in Dec 2015)
3 AFFF tanks, 800, 600, 800 gallon tanks
1987, 1986, 2005
* Inadvertant release from hangar,
minor leaks in room

275 - has HEF, never had AFFF

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
41	USGS40000994059	1/2 - 1 Mile SSE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	ORI500000031118	0 - 1/8 Mile ENE
A2	ORI500000031125	0 - 1/8 Mile NE
3	ORI500000031113	0 - 1/8 Mile SSE
A4	ORI500000031126	0 - 1/8 Mile NNE
A5	ORI500000031139	0 - 1/8 Mile NE
A6	ORI500000031132	0 - 1/8 Mile NE
A7	ORI500000031137	0 - 1/8 Mile NE
A8	ORI500000034871	0 - 1/8 Mile NNE
A9	ORI500000034872	0 - 1/8 Mile NE
A10	ORI500000031134	0 - 1/8 Mile NE
A11	ORI500000031116	0 - 1/8 Mile NE
A12	ORI500000031127	0 - 1/8 Mile NE
B13	ORI500000031112	1/8 - 1/4 Mile ENE
C14	ORI500000027401	1/8 - 1/4 Mile South
C15	ORI500000028040	1/8 - 1/4 Mile South
B16	ORI500000031123	1/8 - 1/4 Mile NE
B17	ORI500000034868	1/4 - 1/2 Mile NE
D18	ORI500000031121	1/4 - 1/2 Mile NE
E19	ORI500000027405	1/4 - 1/2 Mile SSW
E20	ORI500000028041	1/4 - 1/2 Mile SSW

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
Q126	ORI500000030629	1/2 - 1 Mile North
S127	ORI500000030052	1/2 - 1 Mile North
S128	ORI500000034750	1/2 - 1 Mile North
T129	ORI500000038892	1/2 - 1 Mile WSW
V130	ORI500000030049	1/2 - 1 Mile North
T131	ORI500000039200	1/2 - 1 Mile WSW
132	ORI500000031735	1/2 - 1 Mile WSW
W133	ORI500000030048	1/2 - 1 Mile NNW
134	ORI500000030050	1/2 - 1 Mile North
W135	ORI500000034595	1/2 - 1 Mile NNW
136	ORI500000048132	1/2 - 1 Mile NNE
X137	ORI500000030334	1/2 - 1 Mile West
X138	ORI500000030335	1/2 - 1 Mile West
X139	ORI500000030344	1/2 - 1 Mile West
X140	ORI500000031703	1/2 - 1 Mile West
X141	ORI500000030341	1/2 - 1 Mile West
X142	ORI500000030332	1/2 - 1 Mile West
X143	ORI500000030346	1/2 - 1 Mile West
X144	ORI500000042243	1/2 - 1 Mile West
X145	ORI500000034685	1/2 - 1 Mile West
X146	ORI500000030333	1/2 - 1 Mile West
X147	ORI500000034684	1/2 - 1 Mile West
X148	ORI500000034924	1/2 - 1 Mile West
X149	ORI500000025974	1/2 - 1 Mile West
X150	ORI500000026069	1/2 - 1 Mile West
X151	ORI500000033564	1/2 - 1 Mile West
152	ORI500000030051	1/2 - 1 Mile NNW
153	ORI500000043167	1/2 - 1 Mile SE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

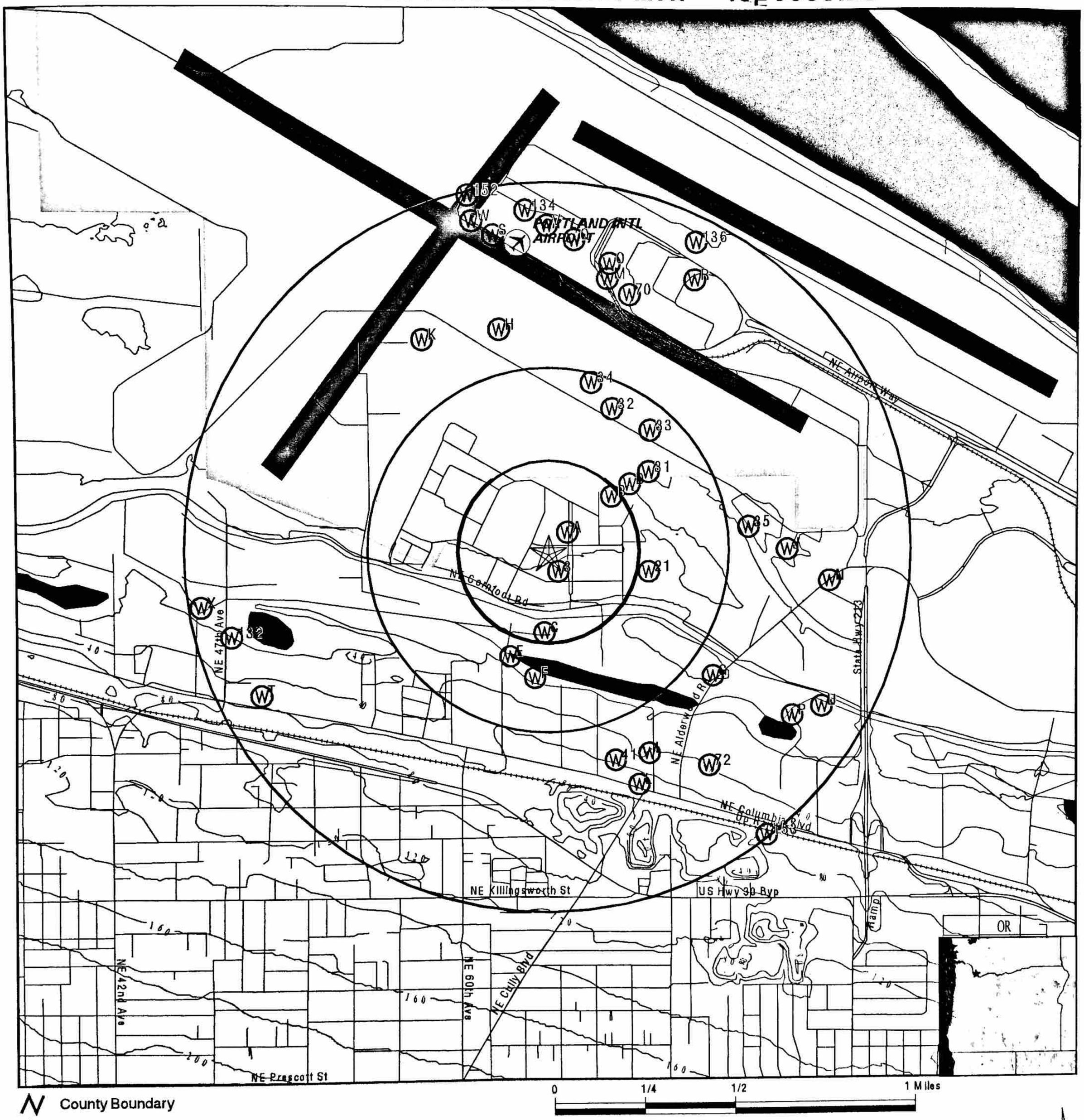
MAP ID	WELL ID	LOCATION FROM TP
21	ORI500000031114	1/4 - 1/2 Mile East
D22	ORI500000031124	1/4 - 1/2 Mile NE
D23	ORI500000031120	1/4 - 1/2 Mile NE
D24	ORI500000034870	1/4 - 1/2 Mile ENE
D25	ORI500000031122	1/4 - 1/2 Mile ENE
D26	ORI500000031115	1/4 - 1/2 Mile NE
E27	ORI500000027406	1/4 - 1/2 Mile SSW
E28	ORI500000028063	1/4 - 1/2 Mile SSW
F29	ORI500000028064	1/4 - 1/2 Mile South
F30	ORI500000033936	1/4 - 1/2 Mile South
31	ORI500000031117	1/4 - 1/2 Mile NE
32	ORI500000035485	1/4 - 1/2 Mile NNE
33	ORI500000012409	1/4 - 1/2 Mile NE
34	ORI500000012678	1/4 - 1/2 Mile NNE
35	ORI500000034867	1/2 - 1 Mile East
G36	ORW500000007682	1/2 - 1 Mile SE
G37	ORW500000007684	1/2 - 1 Mile SE
G38	ORW500000007683	1/2 - 1 Mile SE
H39	ORI500000050753	1/2 - 1 Mile North
H40	ORI500000050751	1/2 - 1 Mile North
H42	ORI500000050750	1/2 - 1 Mile North
H43	ORI500000050749	1/2 - 1 Mile North
H44	ORI500000050752	1/2 - 1 Mile North
I45	ORI500000042830	1/2 - 1 Mile SSE
H46	ORI500000050745	1/2 - 1 Mile NNW
H47	ORI500000050744	1/2 - 1 Mile NNW
H48	ORI500000050743	1/2 - 1 Mile NNW
H49	ORI500000050742	1/2 - 1 Mile NNW
H50	ORI500000050746	1/2 - 1 Mile NNW
H51	ORI500000050741	1/2 - 1 Mile NNW
H52	ORI500000050747	1/2 - 1 Mile NNW
H53	ORI500000050740	1/2 - 1 Mile NNW
H54	ORI500000050748	1/2 - 1 Mile NNW
H55	ORI500000050739	1/2 - 1 Mile NNW
I56	ORI500000042829	1/2 - 1 Mile SSE
J57	ORI500000029198	1/2 - 1 Mile East
J58	ORI500000029199	1/2 - 1 Mile East
K59	ORI500000034593	1/2 - 1 Mile NNW
K60	ORI500000030040	1/2 - 1 Mile NNW
J61	ORI500000029204	1/2 - 1 Mile East
K62	ORI500000030041	1/2 - 1 Mile NNW
K63	ORI500000030042	1/2 - 1 Mile NNW
K64	ORI500000030045	1/2 - 1 Mile NNW
K65	ORI500000030044	1/2 - 1 Mile NW
K66	ORI500000030043	1/2 - 1 Mile NNW
L67	ORW500000003670	1/2 - 1 Mile SSE
L68	ORI500000042831	1/2 - 1 Mile SSE
M69	ORI500000030047	1/2 - 1 Mile North
70	ORI500000030086	1/2 - 1 Mile NNE
M71	ORI500000030083	1/2 - 1 Mile NNE
72	ORI500000012179	1/2 - 1 Mile SE
M73	ORI500000034737	1/2 - 1 Mile NNE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
M74	ORI500000030627	1/2 - 1 Mile NNE
M75	ORI500000037652	1/2 - 1 Mile NNE
M76	ORI500000035468	1/2 - 1 Mile NNE
M77	ORI500000030084	1/2 - 1 Mile NNE
M78	ORI500000037650	1/2 - 1 Mile NNE
M79	ORI500000037651	1/2 - 1 Mile NNE
M80	ORI500000037648	1/2 - 1 Mile NNE
M81	ORI500000035471	1/2 - 1 Mile NNE
M82	ORI500000037649	1/2 - 1 Mile NNE
M83	ORI500000030085	1/2 - 1 Mile NNE
M84	ORI500000035486	1/2 - 1 Mile NNE
N85	ORI500000025963	1/2 - 1 Mile East
N86	ORI500000027527	1/2 - 1 Mile East
M87	ORI500000035484	1/2 - 1 Mile North
M88	ORI500000030046	1/2 - 1 Mile North
O89	ORI500000035487	1/2 - 1 Mile North
O90	ORI500000035488	1/2 - 1 Mile NNE
O91	ORI500000035495	1/2 - 1 Mile NNE
P92	ORI500000028472	1/2 - 1 Mile SE
P93	ORI500000034125	1/2 - 1 Mile SE
P94	ORI500000028476	1/2 - 1 Mile SE
P95	ORI500000028475	1/2 - 1 Mile ESE
P96	ORI500000028474	1/2 - 1 Mile SE
P97	ORI500000028473	1/2 - 1 Mile SE
Q98	ORI500000030630	1/2 - 1 Mile North
R99	ORI500000048149	1/2 - 1 Mile NNE
R100	ORI500000048147	1/2 - 1 Mile NNE
R101	ORI500000048141	1/2 - 1 Mile NNE
R102	ORI500000048140	1/2 - 1 Mile NNE
R103	ORI500000048143	1/2 - 1 Mile NNE
R104	ORI500000048142	1/2 - 1 Mile NNE
R105	ORI500000048137	1/2 - 1 Mile NNE
R106	ORI500000048136	1/2 - 1 Mile NNE
R107	ORI500000048139	1/2 - 1 Mile NNE
R108	ORI500000048138	1/2 - 1 Mile NNE
R109	ORI500000048146	1/2 - 1 Mile NNE
R110	ORI500000048135	1/2 - 1 Mile NNE
R111	ORI500000048144	1/2 - 1 Mile NNE
R112	ORI500000048145	1/2 - 1 Mile NNE
R113	ORI500000048130	1/2 - 1 Mile NNE
R114	ORI500000048131	1/2 - 1 Mile NNE
R115	ORI500000048134	1/2 - 1 Mile NNE
R116	ORI500000048133	1/2 - 1 Mile NNE
R117	ORI500000048129	1/2 - 1 Mile NNE
R118	ORI500000048128	1/2 - 1 Mile NNE
S119	ORI500000030053	1/2 - 1 Mile North
T120	ORI500000038891	1/2 - 1 Mile WSW
U121	ORI500000029316	1/2 - 1 Mile ESE
U122	ORI500000034388	1/2 - 1 Mile ESE
V123	ORI500000034594	1/2 - 1 Mile North
U124	ORI500000025955	1/2 - 1 Mile ESE
U125	ORI500000033963	1/2 - 1 Mile ESE

PHYSICAL SETTING SOURCE MAP - 4360085.2s

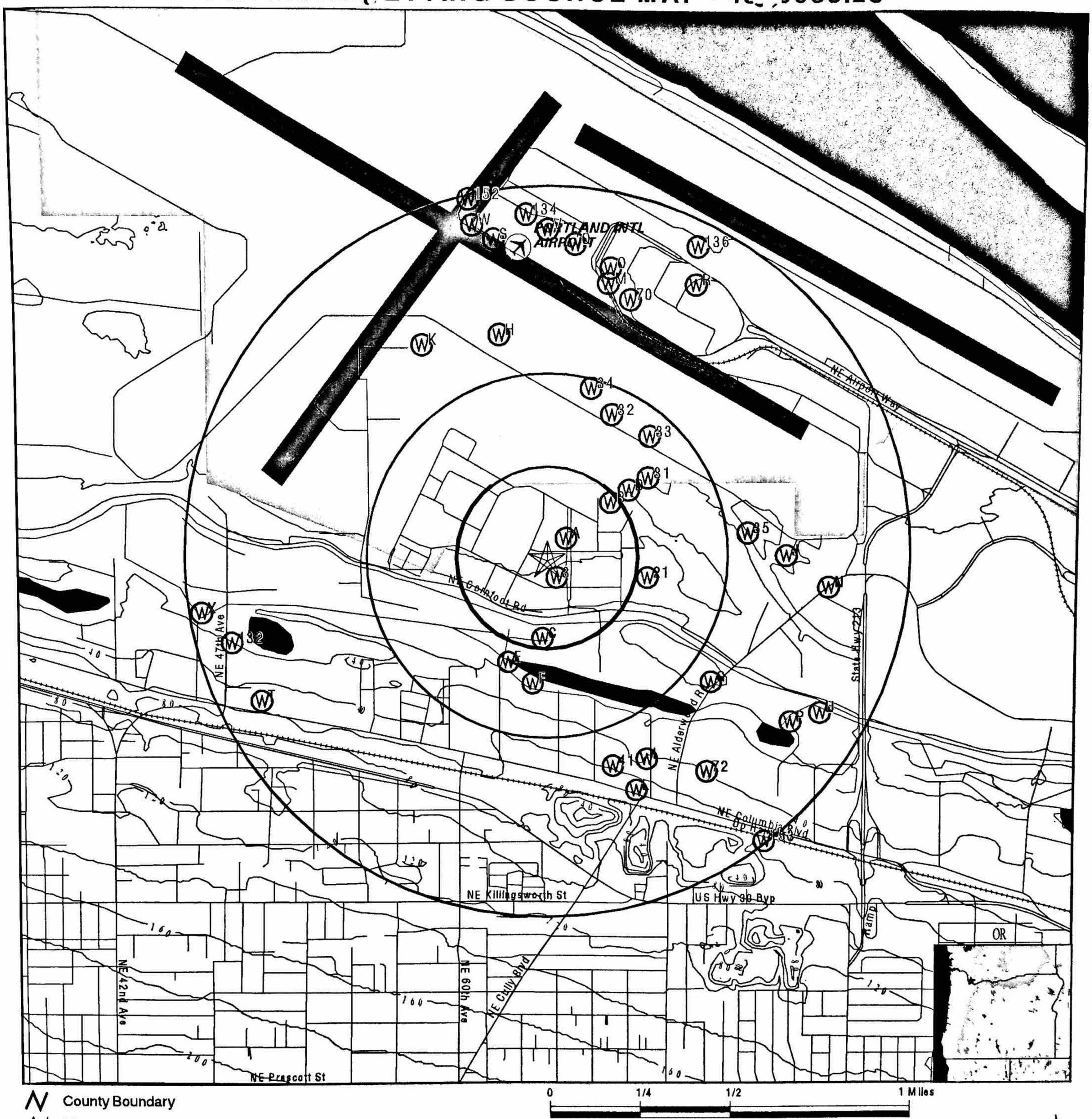


- County Boundary
- Major Roads
- Contour Lines
- Airports
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons

- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location

SITE NAME: Portland ANGB ADDRESS: 6801 NE Cornfoot Road Portland OR 97218 LAT/LONG: 45.5766 / 122.5958	CLIENT: B.B. & E CONTACT: Veronica Allen INQUIRY #: 4360085.2s DATE: July 21, 2015 4:50 pm

PHYSICAL SETTING SOURCE MAP - 4360085.2s



- County Boundary
- Major Roads
- Contour Lines
- Airports
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
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LAT/LONG: 45.5766 / 122.5958	INQUIRY #: 4360085.2s DATE: July 21, 2015 4:50 pm

PORTLAND ANGB

PORTLAND

Portland Well Field

Portland International Airport

Portland Metro Washington Park Zoo

Maywood Park

Powell Butte

Mt Scott

Mt Talbert

Columbia River

Willamette River

Vancouver

Lake Oswego

Cook Pit

0 12,000

FEET

OVERVIEW MAP - 4360085.2S

- Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- County Boundary
- Power transmission lines
- Pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

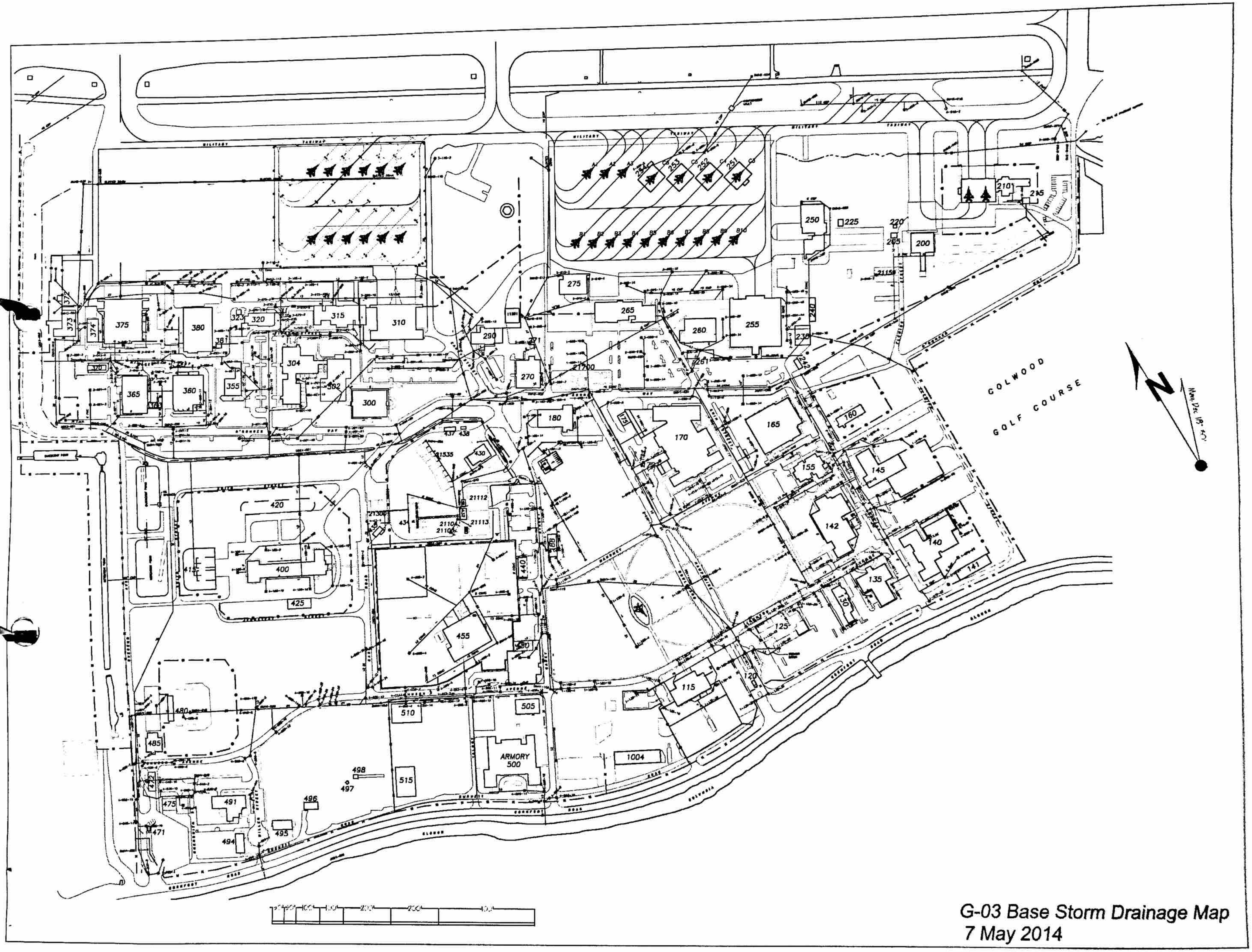
SITE NAME: Portland ANGB	CLIENT: B.B. & E
ADDRESS: 6801 NE Cornfoot Road Portland OR 97218	CONTACT: Veronica Allen
LAT/LONG: 45.5766 / 122.5958	INQUIRY #: 4360085.2s DATE: July 21, 2015 4:47 pm

1372
2017

Oregon Air National Guard Base COMM

APPENDIX C-5

EDR POTENTIAL ENVIRONMENTALLY SENSITVE AREAS MAP



G-03 Base Storm Drainage Map
7 May 2014

Sent: Field, Jennifer A <[redacted]gonstate.edu>
To: Thursday, December 28, 2017 12:49 PM
Subject: HAFLEY Dan
RE: PDX Fire Training Areas investigation

Dan, I would be happy to take a look at your document and provide comments.
Jennifer

From: HAFLEY Dan [mailto:Dan.HAFLEY@state.or.us]
Sent: Thursday, December 28, 2017 12:38 PM
To: Field, Jennifer A
Subject: PDX Fire Training Areas investigation

Jennifer –

DEQ is well into review of the Apex ***Original and Former Fire Training Facilities, Investigation Results Report*** prepared for the Port of Portland. We will be preparing comments on the report, but acknowledge that the results represent a second round of screening-level investigation. We will meet with the Port in January to discuss next steps, including both additional "delineation" work and installation of monitoring wells to start generating higher quality groundwater data.

To the extent that you have comments/thoughts on the report, we would be happy to receive them and consider prior to finalizing our feedback to the Port. Feedback on the following would be of particular interest:

- survey of regulatory screening values presented in Appendix A;
- data QA/QC discussion in Appendix D;
- results of TOP assay analysis, and conclusion that detected PFAS compounds are unlikely to "weather to substances of concern such as PFOA" (Section 4.4.5 and Appendix D);
- recommendation for analytical work in the next phase of investigation.

<u>If</u> you have time, feedback before mid-January would be helpful.

Thanks.

Daniel J. Hafley, RG
Senior Project Manager / Hydrogeologist
Northwest Region Cleanup Section
Oregon DEQ

DEQ
State of Oregon
Department of
Environmental
Quality

The groundwater screening level will be used as the surface water screening level.

If the RSL values change prior to preparation of the Draft SI Reports, the most current RSL values would be used as the screening levels in the SI Reports.

For each Potential Release Location (PRL), the SI will provide a defensible NFA decision, develop DQOs for follow-on RI activities for the PRLs not meeting the NFA criteria, or provide an interim response action if appropriate. We would proceed with the RI or interim response action as soon as funds are made available—We do not have a timeline for when these actions would occur. We'll discuss next week, and I'll let you know when we receive more information.

Thanks,
Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil

From: HAFLEY Dan [mailto:dan.hafley@state.or.us]
Sent: Wednesday, August 30, 2017 2:53 PM
To: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Subject: [Non-DoD Source] RE: PFOS/PFOA Site Inspection Kickoff Meeting - Portland ANGB

Fran –

Thanks. We look forward to seeing you next week and will try to arrange for good weather.

I have taken a look at the PP presentation, and a couple of questions come to mind that will probably come up in the meeting:

- We understand that the EPA HA value of 70 ppt will be applied to groundwater data in site investigation risk screening. Do you have any idea on values that might be applied for soil and surface water screening?
- Assuming that PFAS are detected during 2018 investigation, what is the process and general timeline for follow-up investigation?

DH

-----Original Appointment-----
From: Saunders, Frances D CIV USAF NGB A4 (US) [Caution-mailto:frances.d.saunders.civ@mail.mil < Caution-mailto:frances.d.saunders.civ@mail.mil >]
Sent: Wednesday, August 30, 2017 7:12 AM

From: HAFLEY Dan
Sent: Wednesday, September 20, 2017 11:18 AM
To: 'Saunders, Frances D CIV USAF NGB A4 (US)'
Cc: Stan.Jones@portofportland.com; Pinigis, Dennis J CIV USAF NGB A7 (US); Rein, Roger C CIV USAF 142 MSG (US); dbarber@bbande.com; selvam.arunachalam@leidos.com; Shook, Alex D.; Vest, Matthew B.; Stanton Jones; PETERSON Jenn L; POULSEN Mike
Subject: Proposed screening levels for upcoming Portland ANG PFAS investigation

Fran –

I had time to take a closer look at the proposed PFAS screening recommendations below, and will pass the information on to our toxicology staff for consideration. A preliminary concern is that proposed values all appear to be human health-based (only). This is fine for groundwater and perhaps soil, but DEQ is concerned about potential impacts to ecological receptors through exposure to contaminated surface water and sediment. It may be that screening values would be lower for humans, just not sure at this point.

Of course, the *availability* of risk-based screening values for ecological receptors is an important consideration.

Thanks for sending this on and more to follow.

DH

From: Saunders, Frances D CIV USAF NGB A4 (US) [mailto:frances.d.saunders.civ@mail.mil]
Sent: Friday, September 01, 2017 12:07 PM
To: HAFLEY Dan <dan.hafley@state.or.us>
Cc: Stan.Jones@portofportland.com; Pinigis, Dennis J CIV USAF NGB A7 (US) <dennis.j.pinigis.civ@mail.mil>; Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil>; dbarber@bbande.com; selvam.arunachalam@leidos.com; Shook, Alex D. <ALEX.D.SHOOK@leidos.com>; Vest, Matthew B. <MATTHEW.B.VEST@leidos.com>
Subject: RE: [Non-DoD Source] RE: PFOS/PFOA Site Inspection Kickoff Meeting - Portland ANGB

Dan –

Leidos proposes to use the screening levels below for the SIs at Bases that do not have state-specific screening levels:

Soil Screening Level: The resident risk-based screening levels for soil were determined using the EPA RSL calculator and the June 2017 RSL table.
PFOS = 1.26 mg/kg
PFOA = 1.26 mg/kg
PFBS =1,260 mg/kg

Sediment Screening Level:
The soil screening level will be used as the sediment screening level.

Groundwater Screening Level:
PFOS and PFOA combined = 0.07 ug/L (USEPA Lifetime Drinking Water Health Advisory)
PFBS = 400 ug/L (Resident risk-based screening level for Tap water from RSL table)

Surface Water Screening Level:

If the RSL values change prior to preparation of the Draft SI Reports, the most current RSL values would be used a screening levels in the SI Reports.

For each Potential Release Location (PRL), the SI will provide a defensible NFA decision, develop DQOs for follow- activities for the PRLs not meeting the NFA criteria, or provide an interim response action if appropriate. We wou proceed with the RI or interim response action as soon as funds are made available—We do not have a timeline f when these actions would occur. We'll discuss next week, and I'll let you know when we receive more informatio

Thanks,
Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil

From: HAFLEY Dan [mailto:dan.hafley@state.or.us]
Sent: Wednesday, August 30, 2017 2:53 PM
To: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Subject: [Non-DoD Source] RE: PFOS/PFOA Site Inspection Kickoff Meeting - Portland ANGB

Fran –

Thanks. We look forward to seeing you next week and will try to arrange for good weather.

I have taken a look at the PP presentation, and a couple of questions come to mind that will probably come up in th meeting:

- We understand that the EPA HA value of 70 ppt will be applied to groundwater data in site investigation risk screening. Do you have any idea on values that might be applied for soil and surface water screening?
- Assuming that PFAS are detected during 2018 investigation, what is the process and general timeline for follow-up investigation?

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Sent: Wednesday, August 30, 2017 7:12 AM

Well Number/Well Address	Distance and Direction	Potentiometric Location	Depth of Well	Water Uses
1	0.75 miles Northeast	Upgradient/ Downgradient	174 feet	unknown
2	0.75 miles South-southeast	Upgradient	46 feet	unknown
5135 NE Columbia Blvd	0.75 miles Southwest	Upgradient	Surface - draws from Whitaker Ponds/Columbia Slough	Irrigation
6849 NE Columbia Blvd	0.75 miles South	Upgradient	84 feet	Irrigation
6849 NE Columbia Blvd	0.75 miles South	Upgradient	72 feet	Domestic
6900 NE Cornfoot Rd	0.25 miles South	Upgradient	50 feet (?)	Domestic
7313 NE Columbia Blvd	0.75 miles South-southeast	Upgradient	95.5 feet	Irrigation
7313 NE Columbia Blvd	0.75 miles South-southeast	Upgradient	95.5 feet	Irrigation
7313 NE Columbia Blvd	0.75 miles South-southeast	Upgradient	95.5 feet	Irrigation
7101 NE Marine Dr	1.25 miles North-northeast	Upgradient/ Downgradient	129 feet	Domestic

Note: Information for all wells except 1 and 2 was provided by Bain, personal communication

Oregon
Kate Brown, Governor

Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5263

To: Rein, Roger C CIV USAF 142 MSG (US); HAFLEY Dan; Stan.Jones@portofportl...d.com; dbarber@bbande.com; Vest, Matthew B.; selvam.arunachalam@leidos.com; Pinigis, Dennis J CIV USAF NGB A7 (US)
Cc: Shook, Alex D.; Lantagne, Christopher E Col USAF 142 MXG (US); Lay, Jason A Lt Col USAF 142 MSG (US); Conklin, Steven L TSgt USAF NG ORANG (US); Peterson, John M SMSgt USAF 142 FW (US); Lee, Jason E 1st Lt USAF 142 FW (US); Collier, Kimberly T MajUSAF 142 MSG (US); Safe, Kenneth C MSgt USAF 142 MSG (US); Fogel, Rick M NFG USAF 142 MSG (US)
Subject: PFOS/PFOA Site Inspection Kickoff Meeting - Portland ANGB
When: Wednesday, September 06, 2017 4:00 PM-5:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Portland ANGB - Bldg 140 Civil Engineering Classroom (Call in Number 855-462-5367, Conference code: 3378730)

All: Attached are the slides for the PFOS/PFOA Site Inspection Kickoff meeting. Thanks. ...Fran

****

All:

The PFC Site Inspection Kickoff meeting and site visit is scheduled for Wed, 6 Sep at Portland ANGB. **The site walk will start at 9 am**, and the **meeting will be from 1-2 pm**. The Bldg 140 Civil Engineering Classroom is reserved all day, sowe will meet there at 9 am, and the 1 pm meeting will also be there. See attached map for directions.

If you want to take pictures, you will have to meet Roger at **8 am** in his office in bldg. 140 so he can escort you to the command post to get a photo permit.

If you don't have a CAC, please send the following information to Roger Rein so he can process you for a security clearance at least 3-business days prior to the meeting:

Name:
Date of Birth:
License State and Number:
Last 4 of SSN:
Do you consent to a criminal background check as a condition to gaining access to the base? (answer yes or no):

Stan: If you can't make it to the meeting on the 6th, please feel free to call in or send someone in your place.

Thanks,
Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
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Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil

HAFLEY Dan

From: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Sent: Tuesday, September 19, 2017 9:22 PM
To: HAFLEY Dan
Subject: RE: NFRAP Concurrence - Portland ANG

Dan – Thank you so much!!! It's a pleasure working with you too. ...Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
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frances.d.saunders.civ@mail.mil

From: HAFLEY Dan [mailto:dan.hafley@state.or.us]
Sent: Tuesday, September 19, 2017 3:33 PM
To: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Cc: Jones, Stan <Stan.Jones@portofportland.com>; dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil>; Herb Clough <HClough@apexcos.com>
Subject: [Non-DoD Source] NFRAP Concurrence - Portland ANG

Fran –

The attached letter documents DEQ concurrence with the NFRAP decision for Sites 1, 2, 3, and 11 at the Oregon Air National Guard facility in Portland. Congratulations. This represents an important milestone in site work, and it continues to be a pleasure working in a productive manner with your project team.

Please let me know if you have questions or comments about the letter. DEQ will proceed with updating our Environmental Cleanup and Site Information database reflecting this decision.

Dan Hafley

HAFLEY Dan

From: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Sent: Monday, September 18, 2017 2:35 PM
To: HAFLEY Dan
Subject: RE: PDX ANG Fire Training 1960s

Hi Dan - Okay, thanks. ...Fran

-----Original Message-----
From: HAFLEY Dan [mailto:dan.hafley@state.or.us]
Sent: Sunday, September 17, 2017 1:24 PM
To: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>; Shook, Alex D. <ALEX.D.SHOOK@leidos.com>
Cc: Adam Reese (AReese@apexcos.com) <AReese@apexcos.com>; Jacobs, Teresa <Teresa.Jacobs@portofportland.com>; Jones, Stan <Stan.Jones@portofportland.com>; Rein, Roger C CIV USAF 142 MS (US) <roger.c.rein.civ@mail.mil>; dbarber@bbande.com
Subject: [Non-DoD Source] RE: PDX ANG Fire Training 1960s

Thank you Fran. DEQ will be reviewing this, and perhaps other related documents, to get a better sense of the decisio making around closeout of Site 7. No looking to re-open it for contaminants other than PFAS, but depending on the results of the PFAS investigation we will consider whether it might make sense to complete some "confirmatory" sampling, for example for TPH constituents.

Dan Hafley

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Subject: RE: PDX ANG Fire Training 1960s

Dan and Alex:

Attached is text and a drawing Doug Barber found concerning Site 7 (Burn Pit) taken from the 2001 Final FS by ERM. It should help in locating the center of the pit during the SI. There is lik survey information in the Final RI.

There are many documents with similar drawings around this same time period and earlier.

Thanks,
Fran

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3501 Fetchet Ave - Shepperd Hall

1372
COMM

Oregon
Kate Brown, Governor

Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5263
FAX (503) 229-6945
TTY 711

September 11, 2017

via electronic delivery

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157

RE: Pending PFAS Site Investigation
Portland Air National Guard
ECSI# 1372

Fran:

Thank you for allowing DEQ staff to participate in the site tour and meeting held on September 6, 2017 related to upcoming development and implementation of Air National Guard (ANG) plans to investigate perfluorinated compound (PFC) releases at the Oregon ANG 142nd Fighter Wing base. It was a pleasure to meet you and your team, and we found the day's activities to be very productive.

As you know, an ANG contractor completed a Preliminary Assessment identifying a number of Potential Release Locations (PRLs) which appeared to warrant follow-up (site investigation) work. We inspected each PRL during the inspection, and in general concur with ANG plans for follow-up investigation. At one location – POL Storage Building 431 – follow-up investigation does not appear to be necessary. This conclusion is based our inspection of AFFF storage/use at this location, interview with an ANG employee at the time of the inspection, and supporting information presented in the aforementioned PA.

We look forward to working with you on development of a site inspection work plan for proposed work, and implementation in early 2018.

Please contact me at (503) 229-5417 or by email (hafley.dan@deq.state.or.us) if you have questions or comments about the information presented in this letter.

Respectfully,

Daniel Hafley, RG
Senior Project Manager/Hydrogeologist

Ec: Roger Rein, ANG
Stan Jones, Port of Portland
Alex Shook, Leidos
Doug Barber, BB&E

(U) PFOS/PFOA Site Inspection

Portland ANG Base Kickoff Meeting

Fran Saunders - Air National Guard
Alex Shook - Leidos

6 Sep 2017

EPA Health Advisories for PFOS/PFOA

- EPA Lifetime Health Advisories for PFOS and PFOA (25 May 16)
  - Drinking water at or below which adverse health effects are not anticipated to occur over a lifetime of exposure, are: 0.07 parts per billion (70 parts per trillion) for PFOS and PFOA

Team Members and Introductions

- NGB/A4OR
  - Mr. Winston Crow (Contracting Officer's Representative (COR))
  - Ms. Fran Saunders (Program Manager)
- 142nd Fighter Wing
  - Mr. Roger Rein (Base Environmental Manager)
- Leidos (Task Order Contractor)
  - Mr. Matt Vest, PG (Project Manager)
  - Mr. Selvam Arunachalam, PE (Deputy Project Manager)
- BB&E (Technical Oversight Contractor)
  - Mr. Doug Barber
- Oregon Department of Environmental Quality
  - Mr. Dan Hafley

Meeting Objectives

- Provide
  - An overview of the Emerging Contaminants Program for PFOS/PFOA
- Discuss
  - EPA Health Advisories for PFOS/PFOA
  - AF PFOS/PFOA Guidance/Policy
  - ANG Approach
  - Site Investigation Project Objectives
  - Preliminary Assessment Potential Release Locations
- Plan for SI Field Activities
  - Existing Information
  - SI Field Approach
  - Access
  - Schedule
  - Utility Clearances and Permits
  - Special Concerns & Data Gaps

AF PFOS/PFOA Guidance/Policy

- SAF/IE Policy on Perfluorinated Compounds (PFCs) of Concern (11 Aug 16)
  - Advocate for and allocate for funds for the assessment, investigation, mitigation and environmental response to PFOS/PFOA releases, as needed, to ensure the protection of human health and the environment, consistent with applicable Federal or state law
  - Identify all locations on AF Installations where potential releases could have occurred and confirm whether there exists a potential unacceptable risk to human health and the environment
  - Address any PFOS/PFOA releases that pose unacceptable risk, including migration off-base, in accordance with CERCLA
  - Develop drinking water sampling guidance for PFOS/PFOA--Where drinking water samples indicate unacceptable risk, as defined by exceeding USEPA's lifetime drinking water Health Advisory (HA) for PFOS/PFOA, take appropriate mitigation action for all sources on current and former AF installations, as well as public and private water sources reasonably believed to be contaminated by AF actions
  - Eliminate use of PFOS and PFOA containing AFFF on AF Installations

Project Objectives

- Conduct Site Investigation (SI) Activities to determine the presence or absence of PFOS/PFOA in all potential media (soil, groundwater, surface water and sediment)
  - Delineation of contamination plumes is not in the scope of this task order
- Determine if PFOS/PFOA contaminated groundwater has reached the base boundary
  - Sampling will only be performed on ANG property
- Stormwater outfalls, wet wells, drainage basins and ditches will be sampled at the last available downgradient location on ANG property
- Sampling of drinking water sources is not included

ANG Approach

- Preliminary Assessments (PAs) were conducted at 68 ANG bases and 2 AFR bases in 2015/2016 by BB&E
  - 9 ANG base PA's were completed by AFCEC
  - 687 total Potential Release Locations (PRLs) identified
- 4 ANG SI Contracts have been awarded
  - 2 were awarded in FY16
    - 39 ANG bases – 388 PRLs
  - 2 were awarded in FY17
    - 29 ANG bases – 263 PRLs
  - Period of Performance (POP) is 18 months from date of award

AF PFOS/PFOA Guidance/Policy

- Revised Site Management Procedures – Update to DoD Manual 4715.20 (Defense Restoration Program Management (DERP)) (22 Aug 16)

UNCLASSIFIED

Project Team

NGB/A4OR

Winston Crow (COR)
Fran Saunders (Program Manager)

Base Environmental Manager

Roger Rein

Leidos Program Manager

Connie Samson, PMP

Leidos Project Manager

Matthew Vest, P.G., PMP

Leidos Deputy Project Manager

Selvam Arunachalam, P.E.

Leidos Health and Safety

Steve Lowery

Leidos Quality Assurance

Kim Murphree, P.E.

Technical Resources

Engineers	GIS/CADD
Chemists	Operators
Geophysicists	Field Technicians
Geologists	Data Manager

Field Subcontractors

Analytical Laboratory
Drillers
Surveyors
Waste T&D

8 Hangar 375

7 Hangar 380

6 Hangar 310

5 Old Fire Department and Swale
Building 290

10 Ponds/stormwater
retention basins

2 New Fire Department
Building 180

9 POL Storage
Building 431

4 Hangar 255

1 Base Supply
Building 170

Note: Existing wells, if available, will be used for GW sampling (where appropriate).

otes:
umbers associated with potential AFFF PFC AOCs
rrespond to Table 1 of this PFC PA Site Visit Report.

FF - aqueous film forming foam
OC - area of concern
- preliminary assessment
C - perfluorinated compounds
XL - petroleum, oil, and lubricants

Legend

- Potential AFFF PFC AOCs (approximate)
- Installation Area (approximate)
- Potential Sample Locatio
- Area Not Part of SI

NORTH

0 500 1,000
Feet

Site Features Map and Potential AOCs

Portland Air National Guard Base
Portland, Oregon

BB&E

Project Tasks

- Task 1: QCP
- Task 2: Site Inspection (SI)
  - SI Site Visit and Work Plan
    - Site Visit
      - Kick-Off meeting with Base Environmental Manager
      - Verify existence and location of monitoring wells
      - Formalize location of sampling locations
      - Identify any logistical challenges (restricted areas, concrete coring, timing of field work due to mission impacts)
    - SI Work Plan
      - Refine conceptual site model
  - SI Field Work
  - SI Report

Potential PFOS/PFOA Release Locations

1. New FD – Building 180
2. Hangar 250
3. Hangar 255
4. Old FD and Swale – Building 290
5. Hangar 310
6. Hangar 380
7. Hangar 375
8. POL Storage – Building 431
9. Ponds/Stormwater Retention Basins

8 Hangar 375

7 Hangar 380

6 Hangar 310

5 Old Fire Department and Swale
Building 290

10 Ponds/stormwater
retention basins

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- preliminary assessment
C - perfluorinated compounds
L - petroleum, oil, and lubricants

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- Potential AFFF PFC AOCs (approximate)
- Installation Area (approximate)
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- Area Not Part of SI

NORTH

0 1000 2000
Feet

Site Features Map and Potential AOCs

Portland Air National Guard Base
Portland, Oregon

BB&E

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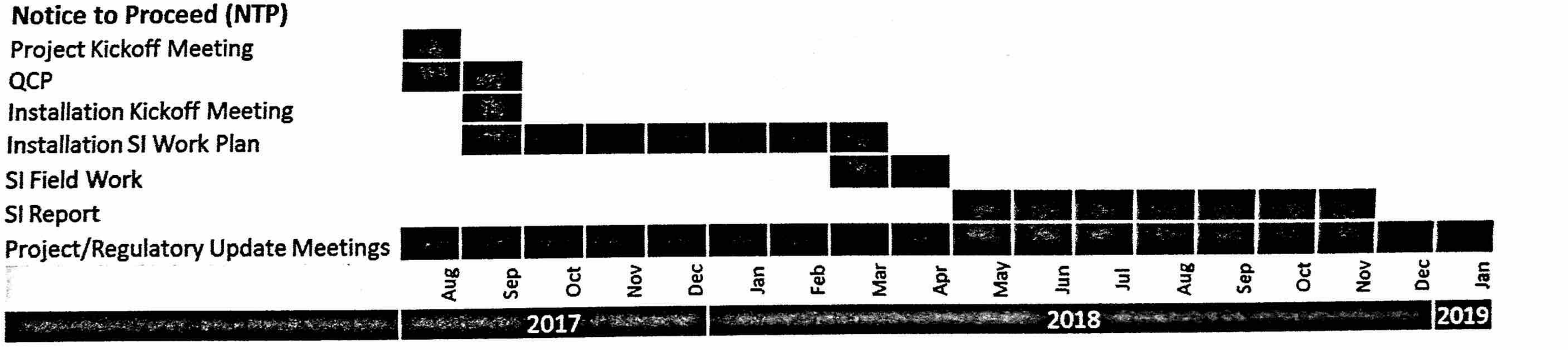
Notice to Proceed (NTP)
Project Kickoff Meeting
QCP
Installation Kickoff Meeting
Installation SI Work Plan
SI Field Work
SI Report
Project/Regulatory Update Meetings
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
2017
2018
2019

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The groundwater screening level will be used as the surface water screening level.

If the RSL values change prior to preparation of the Draft SI Reports, the most current RSL values would be used as the screening levels in the SI Reports.

For each Potential Release Location (PRL), the SI will provide a defensible NFA decision, develop DQOs for follow-on RI activities for the PRLs not meeting the NFA criteria, or provide an interim response action if appropriate. We would proceed with the RI or interim response action as soon as funds are made available—We do not have a timeline for when these actions would occur. We'll discuss next week, and I'll let you know when we receive more information.

Thanks,
Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil

From: HAFLEY Dan [Caution-mailto:dan.hafley@state.or.us < Caution-mailto:dan.hafley@state.or.us >]
Sent: Friday, August 04, 2017 12:16 PM
To: Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil < Caution-mailto:roger.c.rein.civ@mail.mil > >; Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil < Caution-mailto:frances.d.saunders.civ@mail.mil > >
Subject: [Non-DoD Source] FW: Preliminary Assessment Report - PDX Aqueous Film-Forming Foam Use

---

Roger and Fran –

Please note that DEQ has received the attached preliminary assessment from the Port of Portland outlining the storage, use, etc. of fire-fighting foams on Portland International Airport property. Based on the detection of PFOS, PFOA, and related compounds in groundwater at the former fire training pits on PIA property, plans are being developed by the Port for broader assessment under DEQ.

I can be reached at (503) 229-5417.

Dan Hafley

Daniel J Hafley, RG
Senior Project Manager/Hydrogeologist
Northwest Region Cleanup Section
Oregon DEQ

From: Adam Reese [Caution-Caution-mailto:AReese@apexcos.com]
Sent: Friday, August 04, 2017 8:42 AM
To: HAFLEY Dan <HAFLEY.Dan@deq.state.or.us < Caution-mailto:HAFLEY.Dan@deq.state.or.us > >
Cc: Stanton Jones <Stan.Jones@portofportland.com < Caution-mailto:Stan.Jones@portofportland.com > >; Read, Daniel <Daniel.Read@portofportland.com < Caution-mailto:Daniel.Read@portofportland.com > >; Jacobs, Teresa <Teresa.Jacobs@portofportland.com < Caution-mailto:Teresa.Jacobs@portofportland.com > >; Herb Clough <HClough@apexcos.com < Caution-mailto:HClough@apexcos.com > >; Ashleigh Fines <AFines@apexcos.com < Caution-mailto:AFines@apexcos.com > >
Subject: Preliminary Assessment Report - PDX Aqueous Film-Forming Foam Use

Dan,

Good morning. On behalf of the Port of Portland, please find attached the Preliminary Assessment Report for Aqueous Film-Forming Foam Use at PDX. We are sending you 2 hard copies in the mail. Please let us know if you have any questions or comments.

Thanks,

Adam

HAFLEY Dan

From: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Sent: Friday, August 18, 2017 5:50 AM
To: HAFLEY Dan
Cc: Rein, Roger C CIV USAF 142 MSG (US); dbarber@bbande.com
Subject: FW: [Non-DoD Source] FW: Preliminary Assessment Report - PDX Aqueous Film-Forming Foam Use
Attachments: Notice and Tender of OR DEQ Site Cleanup Claim Regarding Fire Training A....pdf; Letter from NGB-A4OR to Port of Portland_31 Oct 2016.pdf
Signed By: SAUNDERS.FRANCES.DILL.1024608480

Dan –

Thank you for sending the Port's PA report. Please see BB&E's comments in Doug's email below.

Some of the verbiage from Section 4.3 was taken from our Oct 2016 letter to the Port in response to their letter (letters attached). But I'm not sure about the Port's comment in Section 8.2.2 and why they think OANG is in communication with DEQ to investigate the former and current OANG training facilities. The SI activities under the project awarded last month will be conducted to determine the presence or absence of PFOS and PFOA in all potential media and to determine if PFOS/PFOA contaminated groundwater has reached the base boundary. Sampling will only be performed on ANG property, and delineation of contamination plumes is not in the scope of this task order.

Looking forward to the kickoff meeting next month. If you haven't already, can you please send your information (see calendar invitation) to Roger so he can arrange for base access. He should be back from leave on 24 Aug. I haven't heard back from Stan, so I don't know If he or anyone from the Port will be attending.

Thanks,
Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil

From: Doug Barber [mailto:dbarber@bbande.com]
Sent: Thursday, August 17, 2017 12:26 PM
To: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Cc: Doug Barber <dbarber@bbande.com>
Subject: RE: [Non-DoD Source] FW: Preliminary Assessment Report - PDX Aqueous Film-Forming Foam Use

Fran –

I hope you are well.

BB&E has reviewed the subject and offers the following, for your consideration:

1. The general approach to not consider hangars and buildings that store AFFF, along with the numerous locations where AFFF has been applied to fuel spills/training exercise is curious. Under ANG direction, BB&E included these areas in our 2016 PFC PA so it seems incomplete for these to be excluded from the PDX PA.
2. Section 4.1 discusses the presumption that the use of AFFF at the OANG began in 1963, rather than 1970. There is also a statement that the US military has been using AFFF since the product's development in 1963, but there is no reference for this. While this may be accurate (again, no reference to verify), the information we have been using is that the Air Force began using the product circa 1970.
3. Section 4.1 has varying dates for the BB&E PFC PA. The correct date of the final report submitted to the ANG is April 2016.
4. Of note (and for clarification): Section 4.3 states that the Port has notified the OANG that they will be required to investigate former leasehold areas for AFFF under the terms of its lease. Therefore, Section 8.2.2 states that the Former OANG Fire Station (located NW of the current Base boundary) and the Former OANG FTA (located E of the current Base boundary) are considered high priority sites, and it is the Port's understanding that OANG is in communication with the DEQ on these investigations.

Respectfully,

Douglas J Barber, PG | Principal/Executive Vice President/FSO/ITPSO
BB&E, Inc. | Consulting Engineers and Professionals
235 East Main Street, Suite 107 | Northville, Michigan 48167
office 248.489.9636 ext 301 | cell 248.705.6749

From: Saunders, Frances D CIV USAF NGB A4 (US) [Caution-mailto:frances.d.saunders.civ@mail.mil]
Sent: Friday, August 04, 2017 2:23 PM
To: Doug Barber <dbarber@bbande.com>
Subject: FW: [Non-DoD Source] FW: Preliminary Assessment Report - PDX Aqueous Film-Forming Foam Use

FYI

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil < Caution-mailto:frances.d.saunders.civ@mail.mil >

If you want to take pictures, you will have to meet Roger at **8 am** in his office in bldg. 140 so he can escort you to the command post to get a photo permit.

If you don't have a CAC, please send the following information to Roger Rein so he can process you for a security clearance at least 3-business days prior to the meeting:

Name:
Date of Birth:
License State and Number:
Last 4 of SSN:
Do you consent to a criminal background check as a condition to gaining access to the base? (answer yes or no):

Stan: If you can't make it to the meeting on the 6th, please feel free to call in or send someone in your place.

Thanks,
Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil

<< File: Portland ANG Entry and Location Map-Proceed to B 140.pdf >> << File: PFOS-PFOA SI Kickoff Meeting - Portland ANGB.pptx >>

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS MD 20762-5157

MEMORANDUM FOR Matthew J. Hoffman, A.A.E. 31 OCT 2016
Senior Manager, Aviation Commercial Properties
Port of Portland
7200 NE Airport Way
Portland, OR 97208

FROM: NGB/A4OR

SUBJECT: Notice and Tender of Oregon Department of Environmental Quality's Site Cleanup Claim Regarding Fire Training Areas at the Portland International Airport, Portland, Oregon (PDX). (Your letter dated 17 October 2016)

Dear Mr. Hoffman

Thank you for your letter of October 17, 2016, informing this office of the Oregon Department of Environmental Quality's (DEQ) interest in on-going investigatory activities taking place at the Portland International Airport, Portland, Oregon (PDX). In your letter, you ask when the Air National Guard (ANG) expects to begin its investigation of the historic ANG fire training areas (FTAs) outside of its current lease. The ANG is not ready to commit to an investigation of areas outside of its current lease. The ANG has, however, already begun to investigate whether there have been any releases of Perfluorinated Compounds (PFCs) from ANG activities within the boundaries of the ANG's current lease.

The ANG is conducting its investigation under the authorities of the Defense Environmental Restoration Program and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The ANG completed a Preliminary Assessment (PA) in April of 2016. The purpose of the PA was to identify potential locations of environmental releases of PFCs, specifically from Aqueous Film Forming Foam (AFFF) usage and storage on ANG-leased property. The next step within the CERCLA process is a Site Investigation (SI). The purpose of the SI is to augment the data collected in the PA and to generate sampling and other field data to determine if further action or investigation is appropriate. The SI will determine the presence or absence of PFCs from potential release sites on ANG property in all potential media (soil, groundwater, surface water and sediment) and determine if PFC-contaminated groundwater has reached the base boundary.

The ANG is committed to working with both DEQ and PDX in addressing the concerns that arise from any release of PFCs from ANG activities. Toward that end, the ANG will provide whatever assistance it can to PDX if PDX decides to address the historic FTAs utilized by both the ANG and PDX, but which are not currently located on federally leased property, in DEQ's Voluntary Cleanup Program (VCP). Likewise, as an important stakeholder, the ANG will provide any information generated during the PA/SI to PDX.

VIA UPS OVERNIGHT

October 17, 2016

Direct Line: (503) 415-6351
Facsimile: (503) 548-5961
Email: Matt.Hoffman@portofportland.com

✓NGB/A7
3501 Fetchet Avenue
Andrews AFB, MD 20762-5157

Oregon Air National Guard
Installation Commander
142d Fighter Wing
6801 NE Cornfoot Road
Portland, OR 97218-5000

Re: Notice and Tender of Oregon Department of Environmental Quality's Site Cleanup Claim Regarding Fire Training Areas at the Portland International Airport, Portland, Oregon (PDX)

Dear Sir or Madam:

This letter is to tender the claim by the Oregon Department of Environmental Quality (DEQ) claim to the United States Air National Guard (ANG) for the investigation and, if necessary, remediation of current and former ANG fire training areas at Portland International Airport (PDX or PIA). The Port also requests that ANG work cooperatively with the Port and DEQ as this work is implemented.

The Port of Portland (Port) has received a claim by DEQ relating to suspected contamination at "all historic and current fire training areas on PIA property." DEQ's letter seeks the investigation and cleanup of contaminants likely connected to use of fire training areas, such as hydrocarbons, BTEX, and perfluorinated compounds (PFCs). DEQ has recommended that all current and historic PDX fire training areas be enrolled in the Voluntary Cleanup Program (VCP) in order to have a DEQ Project Manager assigned to oversee completion of investigation and cleanup, provide input and preempt placement of the sites on the Confirmed Release List and Inventory of Hazardous Substances Sites.

The ANG has leased property at PDX since 1949, with various lease boundaries over time. The Port is aware of several current and former fire training areas operated by the ANG, as well as those jointly used by the Port and ANG, identified in the attached map as the Joint Training Area, the Historic ANG Fire Station, and the Historic ANG Fire Training Facility. The ANG's

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS MD 20762-5157

31 OCT 2016

MEMORANDUM FOR Matthew J. Hoffman, A.A.E.
Senior Manager, Aviation Commercial Properties
Port of Portland
7200 NE Airport Way
Portland, OR 97208

FROM: NGB/A4OR

SUBJECT: Notice and Tender of Oregon Department of Environmental Quality's Site Cleanup Claim Regarding Fire Training Areas at the Portland International Airport, Portland, Oregon (PDX). (Your letter dated 17 October 2016)

Dear Mr. Hoffman

Thank you for your letter of October 17, 2016, informing this office of the Oregon Department of Environmental Quality's (DEQ) interest in on-going investigatory activities taking place at the Portland International Airport, Portland, Oregon (PDX). In your letter, you ask when the Air National Guard (ANG) expects to begin its investigation of the historic ANG fire training areas (FTAs) outside of its current lease. The ANG is not ready to commit to an investigation of areas outside of its current lease. The ANG has, however, already begun to investigate whether there have been any releases of Perfluorinated Compounds (PFCs) from ANG activities within the boundaries of the ANG's current lease.

The ANG is conducting its investigation under the authorities of the Defense Environmental Restoration Program and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The ANG completed a Preliminary Assessment (PA) in April of 2016. The purpose of the PA was to identify potential locations of environmental releases of PFCs, specifically from Aqueous Film Forming Foam (AFFF) usage and storage on ANG-leased property. The next step within the CERCLA process is a Site Investigation (SI). The purpose of the SI is to augment the data collected in the PA and to generate sampling and other field data to determine if further action or investigation is appropriate. The SI will determine the presence or absence of PFCs from potential release sites on ANG property in all potential media (soil, groundwater, surface water and sediment) and determine if PFC-contaminated groundwater has reached the base boundary.

The ANG is committed to working with both DEQ and PDX in addressing the concerns that arise from any release of PFCs from ANG activities. Toward that end, the ANG will provide whatever assistance it can to PDX if PDX decides to address the historic FTAs utilized by both the ANG and PDX, but which are not currently located on federally leased property, in DEQ's Voluntary Cleanup Program (VCP). Likewise, as an important stakeholder, the ANG will provide any information generated during the PA/SI to PDX.

If you have any other questions please don't hesitate to contact this office. The point of ntact for technical issues is Frances D. Saunders, Restoration Program Manager, NGB/A4OR, 40) 612-9511, or e-mail at frances.d.saunders.civ@mail.mil. Please direct any legal issues to lr. Randy S. Chambers at (703) 607-2729, or e-mail at randy.s.chambers.civ@mail.mil.

RICHARD P. McCOY, GS-14, P.E.
Branch Chief, Environmental Restoration

cc:
Stan Jones, Port of Portland
Suzanne Barthelmess, Port of Portland
Anzi St. Clair, Port of Portland
Col Jenifer Pardy, 142nd MSG Commander
Roger Rein, 142nd MSG/Environmental Manager

Adam Reese, R.G., C.E.G.
Division Manager

current ground lease (Agreement No. 2013-001) holds the ANG as responsible "for any Hazardous Substance Release whether known or unknown or whether specifically identified under any audit, on the Leased Premises, on formerly leased properties or on other properties, in the air or in adjacent or nearby waterways (including groundwater), including residual contamination." Section 9.10. Under section 9.10 of the lease, the ANG is required to "diligently pursue regulatory closure." See also Sections 9.11 and 9.13.

In the abundance of caution and to ensure compliance with agreement provisions, this letter tenders DEQ's claim to ANG for the investigation and, if necessary, remediation of any current and former ANG fire training areas at PDX located within its current leasehold as well as the former fire training areas identified on the map or known to ANG, and notifies ANG, pursuant to Ground Lease Section 9.15, that the Port will be seeking reimbursement for ANG's portion of any investigation and cleanup costs associated with Port fire training areas jointly used by the Port and the ANG. The Port and DEQ are aware that the ANG is investigating the use of aqueous film-forming foam (AFFF), known to contain PFCs, within its current leasehold as part of a nationwide program. The current scope of this assessment, however, fails to include historic and current ANG training areas outside the current leasehold. The Port expects that any future ANG investigation and cleanup of PFCs will include areas historically leased by ANG at PDX.

The Port has not yet responded to DEQ's demand for the Port to enroll all current and historic fire training areas into its VCP, but expects the Port will begin a DEQ-supervised investigation that at a minimum will include the former joint training area(s), listed in DEQ's ECSI Database as Site ID No. 3324. Given the national significance of DEQ's request, the Port prefers to work with the ANG collaboratively and to have a unified response.

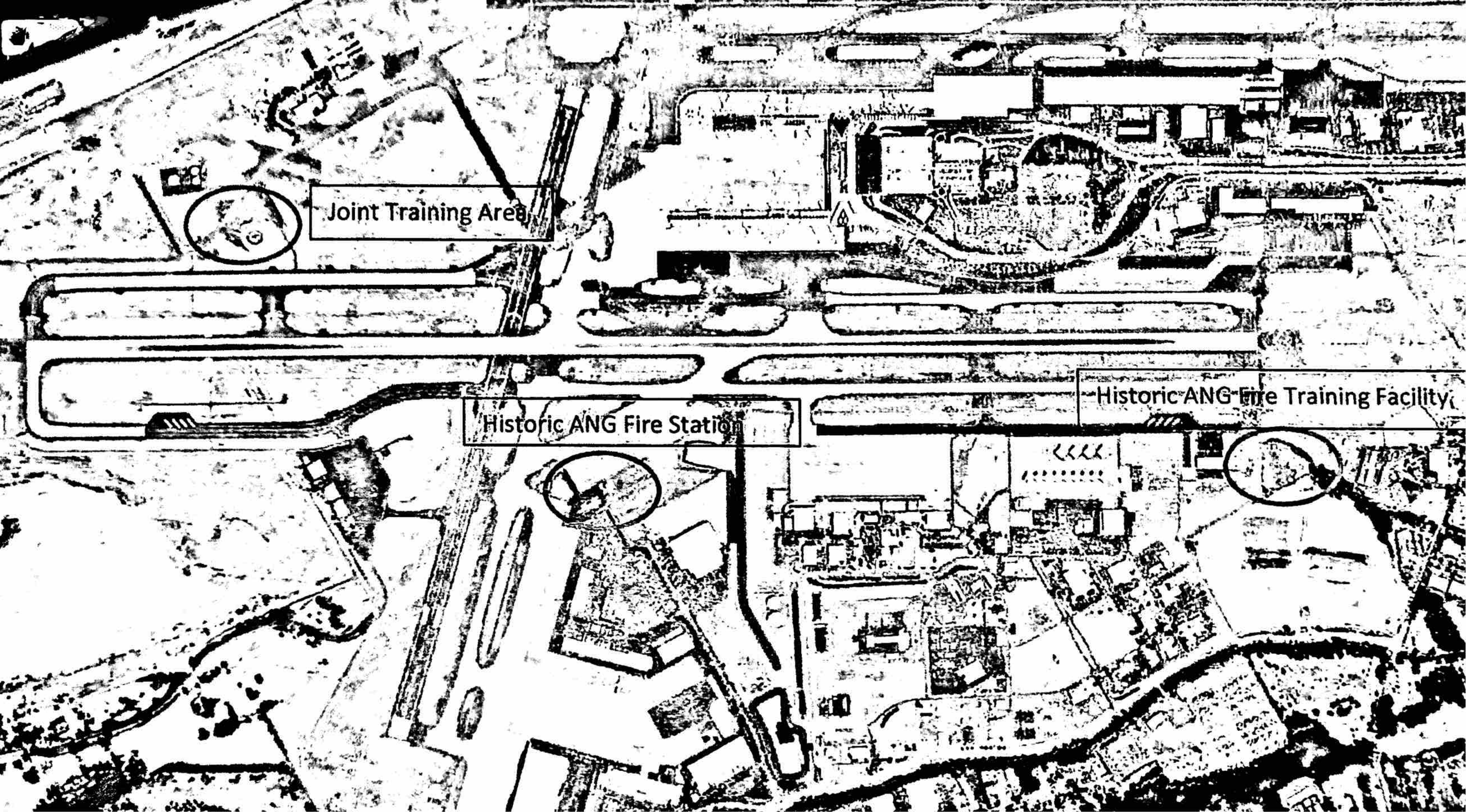
Please respond to this letter within 10 days and indicate (a) when ANG expects it will investigate the historic ANG fire training areas outside of its current lease and (b) how the ANG will fund or participate in a DEQ-supervised investigation of the Joint Training Area.

Very truly yours,

Matthew J. Hoffman, A.A.E.
Sr. Manager, Aviation Commercial Properties

Enclosures: DEQ letter dated September 22, 2016
Map of ANG FTAs Outside Current Leasehold
2013 ANG Ground Lease

cc w/encs: Stan Jones, Port of Portland (email)
Suzanne Barthelmess, Port of Portland (email)
Col. Jenifer Pardy, 142 MSG Commander (email)
Anzie St. Clair, Port of Portland (email)
Roger Rein, United States, 142 MSG/Environmental Manager (email)


Joint Training Area
Historic ANG Fire Station
Historic ANG Fire Training Facility

Oregon
Kate Brown, Governor

Department of Environmental Quality
Northwest Region Portland Office
700 NE Multnomah St., Suite 600
Portland, OR 97232-4100
(503) 229-5263
FAX (503) 229-5471
TTY 711

September 22, 2016 *via electronic delivery*

Stan Jones
Senior Environmental Quality Manager
Port of Portland
7200 NE Airport Way
Portland, OR 97218

RE: Request for Investigation of Perfluorinated Compounds
Portland Airport Fire Training Pits
ECSI# 3324

Mr. Jones:

The US Environmental Protection Agency recently established a drinking water health advisory level of 70 parts per trillion for perfluorinated organic chemicals (PFCs), specifically for the combined concentrations of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS)i. PFCs are a group of synthetic chemicals that have been used in a variety of consumer and industrial applications for over 50 years. Perhaps the most notable use has been as a flame retardant in aqueous film forming foam (AFFF). It is our understanding that AFFF has been used for fire training/suppression activities at the Portland International Airport (PIA) property for a number of years, including both historical (ECSI# 3324) and recent training locations.

While understanding of the toxicity and behavior of these contaminants is evolving, PFCs have been determined to be highly mobile in the environment, and resistant to (natural) degradation processes. As indicated by the very low drinking water advisory level promulgated by EPA, they represent a significant human health concern.

Given the proximity of PIA to water resources including the Columbia South Shore Wellfield (Wellhead Protection Area), DEQ believes that it is both prudent and necessary to evaluate whether these contaminants have been released at your facility, notably in the fire training pits area referenced above. The historical fire training pits are currently identified in DEQ's ECSI database requiring more detailed site investigation, and a medium priority for state follow-up based on a 2002 recommendation by Cleanup Program staff. DEQ requests that you enter into our Voluntary Cleanup Program with the intent to investigate contaminant releases associated with *all* historic and current fire training areas on PIA property, including potential release of PFCs.

Please confirm within 30 days of receipt of this letter that you plan to move forward with requested work.

I can be reached at (503) 229-5417 or by email (hafley.dan@deq.state.or.us) if you have questions or comments about the information presented in this letter.

HAFLEY Dan

From: Saunders, Frances D CIV USAF NGB A4 (US) [frances.d.saunders.civ@mail.mil]
Sent: Tuesday, May 23, 2017 1:30 PM
To: HAFLEY Dan
Subject: RE: [Non-DoD Source] RE: status update requested

Dan -

The PFC Site Inspection (SI) at Portland should be awarded in June/July 2017, and definitely no later than 30 Sep 2017. We have already received proposals for the project, and it's currently under source selection. After the project is awarded, the contractor will have 18 months to complete and deliver a Final SI Report. We can provide you with the contractor's schedule after the project is awarded.

The COR for the project works in my office, so I will know as soon as it's awarded and will keep you in the loop.

Thanks,
v/r
Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil

From: HAFLEY Dan [mailto:dan.hafley@state.or.us]
Sent: Tuesday, May 23, 2017 11:42 AM
To: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Subject: FW: [Non-DoD Source] RE: status update requested

Fran –

Could you provide an update on scheduling for the PFA/PFC work at Portland ANG? Note that initial investigation, in the form of sampling of existing groundwater monitoring wells, has been completed at one location on the adjoining Portland International Airport property. Sampling was completed in a former oil fire training area; high concentrations of perfluorinated compounds were detected. One question DEQ will have for the Port of Portland is whether ANG trained at that location. There is another former fire training location, in the southern portion of the PIA property, that was previously used by ANG for training. DEQ believes that investigation will be necessary.

Thank you.

STATE OF OREGON

NOTICE OF ENVIRONMENTAL CONTAMINATION

Pursuant to ORS 465.200 et seq.

Owner of Record:

Delton Geary
7240 NE Sacramento St.
Portland, OR 97213

Name of Party Filing Notice:

Oregon Department of Environmental Quality (DEQ)
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232 (503) 229-5263

_____ _____

Signature of Party filing Notice **Date**

Title: Kevin Parrett, for
Department of Environmental Quality, Northwest Region

1. Property affected: 7039 S/ NE 46th Avenue, Portland Oregon in Multnomah County on Tax Lot 1N2E Section 18bb 1800 as more particularly presented in the legal description on Exhibit A, attached. The tax lot is depicted in Exhibit B.

2. Known contamination on the property is from the NuWay Oil property activities. The NuWay Oil Company operated at 7039 NE 46th Avenue. Cleanup of the NuWay Oil property was conducted by Oregon DEQ under the Orphan Site program. See DEQ Cleanup File Environmental Cleanup Site Information (ECSI) database #88 for cleanup reports. Investigation of activities on the property only addressed NuWay Oil contamination: other sources may apply.

3. Groundwater from the property should not be used for beneficial uses until concentrations meet the criteria for such beneficial uses, including human consumption.

4. Soil excavated and groundwater extracted from the property should be appropriately managed using the Contaminated Media Management Plan (CMMP) prepared for the property. The CMMP is located on the DEQ ECSI database #88, as well as with the Property Owner at the time of notice issuance. Please implement appropriate health and safety regulations. For further information regarding this notice, contact the Oregon Department of Environmental Quality, Cleanup Program, Northwest Region Office, 700 NE Multnomah St., Suite 600, Portland, Oregon 97232. (503) 229-5263.

AFTER RECORDING, RETURN TO: **Oregon Department of Environmental Quality**
Attn: Sarah Miller (or ECSI #88)
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232

THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME this _____ day of _____, 2017, by Kevin Parrett, NW Region Cleanup and Tanks, Department of Environmental Quality, Northwest Region.

_____ Notary Public for State of Oregon, County of Multnomah.

My Commission expires: _____

STATE OF OREGON
NOTICE OF ENVIRONMENTAL CONTAMINATION
Pursuant to ORS 465.200 et seq.

Owner of Record:

Delton Geary
7240 NE Sacramento St.
Portland, OR 97213

Name of Party Filing Notice:

Oregon Department of Environmental Quality (DEQ)
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232 (503) 229-5263

_____ _____
Signature of Party filing Notice **Date**

Title: Kevin Parrett, for
Department of Environmental Quality, Northwest Region

1. Property affected: 7039 S/ NE 46th Avenue, Portland Oregon in Multnomah County on Tax Lot 1N2E Section 18bb 1800 as more particularly presented in the legal description on Exhibit A, attached. The tax lot is depicted in Exhibit B.

2. Known contamination on the property is from the NuWay Oil property activities. The NuWay Oil Company operated at 7039 NE 46th Avenue. Cleanup of the NuWay Oil property was conducted by Oregon DEQ under the Orphan Site program. See DEQ Cleanup File Environmental Cleanup Site Information (ECSI) database #88 for cleanup reports. Investigation of activities on the property only addressed NuWay Oil contamination: other sources may apply.

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4. Soil excavated and groundwater extracted from the property should be appropriately managed using the Contaminated Media Management Plan (CMMP) prepared for the property. The CMMP is located on the DEQ ECSI database #88, as well as with the Property Owner at the time of notice issuance. Please implement appropriate health and safety regulations. For further information regarding this notice, contact the Oregon Department of Environmental Quality, Cleanup Program, Northwest Region Office, 700 NE Multnomah St., Suite 600, Portland, Oregon 97232. (503) 229-5263.

AFTER RECORDING, RETURN TO: **Oregon Department of Environmental Quality**
Attn: Sarah Miller (or ECSI #88)
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232

THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME this _____ day of _____, 2017, by Kevin Parrett, NW Region Cleanup and Tanks, Department of Environmental Quality, Northwest Region.

_____ Notary Public for State of Oregon, County of Multnomah.

My Commission expires: _____

2013-001

Lease No. ANGTQKD-05-0113-0001
Supersedes Lease No. DACA67-5-82-350

GROUND LEASE

BETWEEN

THE PORT OF PORTLAND

AND

THE UNITED STATES OF AMERICA

HAFLEY Dan

From: Saunders, Frances D CIV USAF NGB A4 (US) [frances.d.saunders.civ@mail.mil]
Sent: Monday, February 13, 2017 10:41 AM
To: HAFLEY Dan
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US)
Subject: RE: Status of Contaminated Area, West of Building 270 (CB013)

Dan -

The PA/SI for CB013 is now scheduled to be funded in FY19 instead of FY17, meaning the project would be awarded in FY19 instead of FY17. The project is likely to be awarded at the end of FY19 (in Sep 2019) with the kickoff meeting occurring either at the end of CY19 or the beginning of CY20, and the work plan and field work starting some time in CY20.

It's possible we could receive funds and award the project earlier than projected, but for planning purposes, you can assume that the project will be awarded at the end of FY19.

I'll let you know if anything changes.

Thanks,
v/r
Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil

-----Original Message-----
From: HAFLEY Dan [mailto:dan.hafley@state.or.us]
Sent: Monday, February 13, 2017 12:36 PM
To: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil>
Subject: [Non-DoD Source] RE: Status of Contaminated Area, West of Building 270 (CB013)

Fran -

Thank you, however I find the "gov speak" a bit challenging. Could you put the info below into layperson's terms, and provide some clarification on "funding" versus "implementation", schedule-wise?

DH

-----Original Message-----
From: Saunders, Frances D CIV USAF NGB A4 (US) [mailto:frances.d.saunders.civ@mail.mil]
Sent: Monday, February 13, 2017 5:10 AM
To: HAFLEY Dan
Cc: dbarber@bbande.com; Rein, Roger C CIV USAF 142 MSG (US)
Subject: Status of Contaminated Area, West of Building 270 (CB013)

Dan -

HAFLEY Dan

From: WISTAR Gil
Sent: Monday, April 03, 2017 4:36 PM
To: ROBERTSON Katie; READ Norm; WILLIAMS Robert K; HILL Rick; HAFLEY Dan
Subject: 16-18 DSMOA hourly budgets and charges (3-31-17).xlsx
Attachments: 16-18 DSMOA hourly budgets and charges (3-31-17).xlsx

Importance: High

Hello, DSMOA Team!

Attached is the quarterly table you've seen before, summarizing hours charged to DSMOA projects compared to 2-year budgets. Because now is the time for the ***annual funding review*** (AFR) by states, I need each of you to look at your projects and write in your best estimates of hours you'll need for each between April 1, 2017 and June 30, 2018, in the far-right column.

Notice the blue highlighted cells with column heading of "Obligated 4/17" (i.e., actual number of hours the components have funded to date – almost always less than project budgets), and "AFR 4/17." My assessment of the FUDS Management Action Plan is that we'll need 15 more hours than the 21 hours now obligated. When I get your numbers, I'll fill in the AFR column for the other rolled up cost centers, and send the data to the Corps.

And don't worry – next year at this time we'll be able to ask for more hours if needed in the 2018 AFR period. So my recommendation is to be realistic about how many more or less hours think are needed for your projects.

Please do this as soon as you can – especially you, Katie, pre-Hong Kong if possible.

Thanks.

Gil
(503) 229-5512

Site or Project Name	Q-Time	PM	Funding source	Hourly budgets, July 2016 to June 2018					Hrs used as of 3/31/17	Hrs rem thru Jun
				HQ	ER	NWR	WR	*Totals*		
ADMIN - AF IR	40577	Wistar	AF IR	26	3	3	3	***35***	8	2
Coos Head ANG - IR	37930	Read	AF IR	3	0	0	157	***160***	155	5
Kingsley Field ANG	37931	Robertson	AF IR	3	150	0	0	***153***	15	13
Portland ANG	37928	Hafley	AF IR	2	0	68	0	***70***	16	54
Camp Withycombe ARMY MMRP	42093	Williams	ARMY MMRP	3	0	107	0	***110***	25	85
ADMIN - FUDS IR	40579	Wistar	FUDS IR	54	10	10	10	***84***	34	50
Camp Adair FUDS IR	42094	Read	FUDS IR	4	0	0	186	***190***	82	10
Kingsley Field FUDS IR	37939	Robertson	FUDS IR	2	115	0	0	***117***	3	11
Tongue Point NAS	37935	Williams	FUDS IR	3	0	187	0	***190***	64	12
Statewide Management Action Plan	37932	Wistar	FUDS MAP	17	3	3	3	***26***	9	17
ADMIN - FUDS MMRP	40580	Wistar	FUDS MMRP	70	10	10	10	***100***	14	86
Boardman AF Range - FUDS MMRP	44268	Hill	FUDS MMRP	5	135	0	0	***140***	1	139
Camp Adair FUDS MMRP	39342	Read	FUDS MMRP	8	0	0	605	***613***	81	532
NAS Whidbey Island (Coos Bay)	41941	Read	NAVY IR	6	0	0	92	***98***	43	55
Total Hours								***2,086***	***550***	1,53
HQ Budget				**206**						
ER Budget					**426**					
NWR Budget						**388**				
WR Budget							**1,066**			
		Obligated 4/17	AFR 4/17							
AF IR Totals		216						***418***	***194***	224
ARMY MMRP Totals		80						***110***	***25***	85
FUDS IR Totals		268						***581***	***183***	398
FUDS MAP Totals		21	+15					***26***	***9***	17
FUDS MMRP Totals		430						***853***	***96***	757
NAVY IR Totals		75						***98***	***43***	55

Oregon
Kate Brown, Governor

Department of Environmental Quality
Northwest Region Portland Office
700 NE Multnomah St., Suite 600
Portland, OR 97232-4100
(503) 229-5263
FAX (503) 229-5471
TTY 711

February 12, 2017

via electronic delivery

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157

RE: Draft Final – NFRAP for Sites 1, 2, 3, & 11
Portland Air National Guard
ECSI# 1372

Ms. Saunders:

Oregon DEQ staff completed review of the ***Draft Final No Further Response Action Planned for Sites 1, 2, 3, & 11 and Basewide ERP Land Use Restrictions***, prepared by Tetra Tech for the Portland Air National Guard site located in Portland. The report summarizes the results of environmental investigation and cleanup activities on the ANG base adjoining the Portland International Airport property under the military's Environmental Restoration Program. The Port of Portland is the owner of both PIA and the ANG base, with ANG occupying the site under a long-term lease. The report addresses the completion of work at Site 1, 2, 3 & 11, as well as other areas (Sites 4 and 9, for example) where cleanup work was previously completed and approved by DEQ.

The report presents an excellent summarization of investigation and cleanup work that has occurred over the course over the past 20+ years, making it an important milestone document. We appreciate your ongoing efforts at the property. DEQ has a few comments on report content which are presented below. A revised report should be submitted for final review and approval.

Comments

Abandonment Wells and Treatment Infrastructure. The report should include a (text) section summarizing (site-wide) well and treatment infrastructure abandonment work, which was an important element of closure work. References for this work, notably the *Final Well Abandonment Completion Report, ERP Sites 1 through 11* (Tetra Tech; March 2016), should be included. DEQ observes from Table 1 that there are a few remaining wells (SD004 and SD011) that remain; please discuss whether they are to be retained for monitoring or will be abandoned.

Land Use and Institutional Controls. The report should include a (text) section summarizing land use or institutional controls (LUC/IC) that are in place, and any short- or longer-term monitoring that will be performed to support the controls. LUC/IC are outlined in Table 1 but no discussion is present in text. We are not aware of any formal land use restrictions for the site under DEQ, for example prohibitions or land or groundwater that are memorialized in a property easement or the like. DEQ notes that 5-year reviews are stipulated in Section 6.2 of the report text, but "none" are identified in Table 1. Our presumption is that these are voluntary. Please clarify.

Comment #	Page	Section/ Paragraph/ Line No.	Comment	A, D, E, FD or X[1]	Response
			• Under Five Year Review (page 2 of 2), none are identified. Section 6.2 of the report indicates that *"Pursuant to CERCLA, the ANG will conduct five-year review of the completed remedy, because contaminants remain onsite above levels that allow for unlimited use and unrestricted exposure at the sites. The objective of the fiver-year review process is to determine whether the remedy remains protective of potential receptors of concern until such time that the ANG can demonstrate site conditions no longer pose an unacceptable risk to human health and the environment."* DEQ notes that the NFA being considered for the site by the State of Oregon is unconditional provided that land and (ground) water use do not change. Five-year review is not necessary, but we consider it prudent. Please clarify that this is a voluntary action by ANG or perhaps required under their lease agreement with the Port. • The purpose of the portion of the table labeled Figures is unclear, and presumably for use by ANG. Please clarify.		been completed to date. Per DoD guidance, five year reviews are completed for sites have not attained UU/UE criteria through removal or treatment. Correct, the table 1 references to site figures and documents are for internal ANG purposes.
5			A final note: ANG has indicated that investigation will occur, likely starting in 2018, to evaluate whether fire training activities on the base, or storage of fire-fighting chemicals including AFFF, may have resulted in environmental contamination. DEQ is currently considering whether it is appropriate to provide a base-wide NFA determination given that this		The ANG requests that the ODEQ consider the NFA determinations for Sites 1, 2, 3, and 11 based on ODEQ's current understanding of conditions as presented in this NFRAP. The ANG is addressing the presence or absence of emerging compound (PFCs) under the CERCLA process at the PANGB and will provide those results when the investigative efforts

A= agree D=disagree E = explanation FD=needs further discussion X=take exception to

Respectfully,

Daniel Hafley, RG
Senior Project Manager/Hydrogeologist

Ec: Keith Johnson, DEQ
Roger Rein, ANG
Stan Jones, Port of Portland

Cc: ECSI# 1372

ANG Responses to ODEQ Comments

Draft Final No Further Response Action Planned for Sites 1, 2, 3, & 11 and Basewide ERP Land Use Restrictions dated January 2017

Comment #	Page	Section/ Paragraph/ Line No.	Comment	A, D, E, FD or X[1]	Response
			investigation has not yet occurred. Based on investigation activities at other bases, it is likely that fire-fighting chemicals (specifically, perfluorinated compounds) will be detected in site media. A decision is forthcoming. ANG fire training activities, and the release of fire-fighting chemicals, also occurred on adjacent Portland International Airport/Port of Portland property. DEQ requested that the base investigation of perfluorinated compounds include these areas; ANG declined. As Port investigation of fire training related environmental releases proceeds, DEQ will consider to what extent environmental contamination may be attributable to ANG.		are complete. If we discover PFOS/PFOA during the Site Investigation, then we would conduct a Remedial Investigation and follow DoD's Revised Site Management Procedures – Update to DoD Manual 4715.20 (attached). If the PFOS/PFOA is identified at a closed site(s), we would reopen the site(s) if it makes sense, or we would create a new site if PFOS/PFOA is discovered at a location not associated with an existing site. PDF Revised Site Management Procec
			End of Comments		

Field Code Changed

A= agree D=disagree E = explanation FD=needs further discussion X=take exception to

From: HAFLEY Dan
Sent: Friday, May 20, 2016 8:56 AM
To: 'Saunders, Frances D CIV USAF NGB A4 (US)'
Cc: Rein, Roger C CIV USAF 142 MSG (US)
Subject: Timing of proposed perfluorinated compounds investigation, Portland ANG

Importance: High

Fran -

The issue of perfluorinated compounds in the environment is of increasing concern here in the Northwest, both on the part of EPA Region 10 and Oregon DEQ. As you may know, EPA is releasing drinking water health advisories for two chemical contaminants of this class - PFOA and PFOS (see link below). DEQ is of course encouraged that the Guard is planning investigation at the Portland ANG facility for this class of contaminants, potentially associated with airfield fire-fighting or fire-training activities. We are concerned, however, that investigation work is not scheduled to take place until 2017 at the earliest. Preliminary work for the Guard has identified a number of areas on the ANG facility where these chemicals were stored, and some releases ~~and~~ Are known or suspected to have occurred.

The Portland ANG facility is located in an area where environmental impacts to groundwater or surface water, in particular, would be of great concern from the standpoint of potentially impacting human health or the environment. Nearby media that could be impacted include the Columbia River, Columbia Slough and the Portland Wellfield, the latter being the backup water supply for the City of Portland. DEQ would like to engage the Guard in discussion of: a) either moving up the time-table for proposed investigation work; or b) collection of a limited number of samples on a more expedited schedule (in 2016) to provide a preliminary screening for the potential presence of perflourinated compounds in site stormwater or groundwater.

We would appreciate your attention on this matter ASAP. Please call or email me at your earliest convenience to discuss.

Respectfully,

Daniel J Hafley, RG
Senior Project Manager/Hydrogeologist
Northwest Region Cleanup Section
Oregon DEQ
(503) 229-5417

https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos

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Sent: Friday, May 20, 2016 8:56 AM
To: 'Saunders, Frances D CIV USAF NGB A4 (US)'
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We would appreciate your attention on this matter ASAP. Please call or email me at your earliest convenience to discuss.

Respectfully,

Daniel J Hafley, RG
Senior Project Manager/Hydrogeologist
Northwest Region Cleanup Section
Oregon DEQ
(503) 229-5417

https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos

From: HAFLEY Dan
Sent: Tuesday, May 23, 2017 11:22 AM
To: Oblander, Peter
Cc: frances.d.saunders.civ@mail.mil; Doug Barber; USAF ANG 142MSG/EM Rein - 142 Environmental Manager (roger.c.rein.civ@mail.mil)
Subject: RE: Portland Air National Guard Base, OR - NFRAP RTCs and Redline Text

Peter –

Thank you for providing the response to comments and redline, which address our comments/concerns. Please send two hard copies of the final document, each with an accompanying CD, for our records. One note: page 5 of the NFA document has a space for DEQ concurrence on the NFA in the form of my signature. This is contrary to our process – we acknowledge a NFA determination in the form of a letter to the responsible party. Please confirm.

DH

From: Oblander, Peter [mailto:Peter.Oblander@tetratech.com]
Sent: Friday, May 19, 2017 9:34 AM
To: HAFLEY Dan
Cc: frances.d.saunders.civ@mail.mil; Doug Barber; USAF ANG 142MSG/EM Rein - 142 Environmental Manager (roger.c.rein.civ@mail.mil)
Subject: Portland Air National Guard Base, OR - NFRAP RTCs and Redline Text

Dan,

Attached are the ANG responses to the ODEQ comments to the No Further Response Action Planned (NFRAP) decision document at the Portland Air National Guard Base, Oregon.

I have attached the response to comment table, and a redline text file with the ANG revisions for your review. Please indicate whether you concur with the ANG changes or have any additional comments.

Feel free to contact me with any questions.

Thank You,

Peter Oblander, P.G.
Direct: 805-681-3234 | Main: 805.681.3100 | Mobile: 805.722-5791 | Fax: 805.681.3108
peter.oblander@tetratech.com

Tetra Tech | Santa Barbara
5383 Hollister Ave., Suite 130 | Santa Barbara, CA 93111 | www.tetratech.com

Respectfully,

Daniel Hafley, RG
Senior Project Manager/Hydrogeologist

Ec: Keith Johnson, DEQ
Phil Ralston, Port of Portland

Cc: ECSI# 3324

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[i] https://www.epa.gov/sites/production/files/2016-05/documents/drinkingwaterhealthadvisories_pfoa_pfos_5_19_16.final_.1.pdf.

Appendix E, Section E-1. The DEQ letter in included here is erroneously identified as an "ODEQ NFA Determination and NFRAP Concurrence Letter". The letter (merely) indicates DEQ's determination that remedial action levels have been met through treatment and monitoring, and that ANG may proceed with development of closure documents. DEQ will issue a NFA determination for the site after final approval of the closure report and completion of a public comment period. Please clarify.

Table 1. There is quite a bit of information presented in this table that is not discussed in report text (see above). Please clarify the following:

- A GeoBase is referenced under the Implementation Document/Mechanism "header". DEQ is not aware of this document/mechanism, or how it might be used. Please clarify.
- Under the LUC Description header, a number of (what appear to be) informal restrictions on groundwater withdrawal, land use, and land transfer are noted, which apparently are memorialized in the GeoBase. These appear to be informal restrictions, perhaps agreed on in conjunction with property owner Port of Portland (?). Please clarify and see our general comment above on LUC/ICs.
- The last column seems to indicate that remaining wells/systems are to be abandoned. Please clarify and discuss in report text. If to be abandoned, please provide a schedule for this work.
- Under Five Year Review (page 2 of 2), none are identified. Section 6.2 of the report indicates that "*Pursuant to CERCLA, the ANG will conduct five-year review of the completed remedy, because contaminants remain onsite above levels that allow for unlimited use and unrestricted exposure at the sites. The objective of the fiver-year review process is to determine whether the remedy remains protective of potential receptors of concern until such time that the ANG can demonstrate site conditions no longer pose an unacceptable risk to human health and the environment.*" DEQ notes that the NFA being considered for the site by the State of Oregon is unconditional provided that land and (ground) water use do not change. Five-year review is not necessary, but we consider it prudent. Please clarify that this is a voluntary action by ANG or perhaps required under their lease agreement with the Port.
- The purpose of the portion of the table labeled Figures is unclear, and presumably for use by ANG. Please clarify.

A final note: ANG has indicated that investigation will occur, likely starting in 2018, to evaluate whether fire training activities on the base, or storage of fire-fighting chemicals including AFFF, may have resulted in environmental contamination. DEQ is currently considering whether it is appropriate to provide a base-wide NFA determination given that this investigation has not yet occurred. Based on investigation activities at other bases, it is likely that fire-fighting chemicals (specifically, perfluorinated compounds) will be detected in site media. A decision is forthcoming.

ANG fire training activities, and the release of fire-fighting chemicals, also occurred on adjacent Portland International Airport/Port of Portland property. DEQ requested that the base investigation of perfluorinated compounds include these areas; ANG declined. As Port investigation of fire training related environmental releases proceeds, DEQ will consider to what extent environmental contamination may be attributable to ANG.

Please contact me at (503) 229-5417 or by email (hafley.dan@deq.state.or.us) if you have questions or comments about the information presented in this letter.

Sent: Tuesday, April 12, 2016 7:41 AM
To: 'Saunders, Frances D CIV USAF NGB A7 (US)'; HAFLEY Dan
Cc: Rein, Roger C CIV USAF 142 MSG (US); dbarber@bbande.com
Subject: RE: Revised Final PFC PA Site Visit Report for Portland

Fran,
Thank you for reaching out. A file CD would be nice.
If you have any questions about the history of off base fire training I can get you in touch with someone from the PDX fire department.

Stan Jones
503.807.6585

From: Saunders, Frances D CIV USAF NGB A7 (US) [mailto:frances.d.saunders.civ@mail.mil]
Sent: Tuesday, April 12, 2016 5:33 AM
To: HAFLEY Dan; Jones, Stan
Cc: Rein, Roger C CIV USAF 142 MSG (US); dbarber@bbande.com
Subject: Revised Final PFC PA Site Visit Report for Portland

Dan and Stan: Attached is a revised PFC PA Site Visit Report for Portland. Section 2.0 was revised to make it clear that fire training is no longer taking place at ERP Site 7. Should we send you each a hard copy and CD?

Stan: I had received your question from Roger about how potential off-base releases will be investigated or addressed. We are looking in to this, and I will respond back as soon as we have an answer.

Thank you,
v/r
Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A7OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil

sand and silty sand layer that occurs at an approximate depth between 5 and 30 feet bgs. The average thickness of the Shallow Zone is approximately 10 feet. The Deep Zone, consisting of fine sand, is encountered between approximately 30 and 55 feet bgs, and has an average thickness of approximately 15 feet.

The Overbank Deposits are underlain by the CRSA, a silty to gravely sand aquifer. Soil samples retrieved from borings drilled into the CRSA at PDX consist predominantly of fine-to-medium sand with abundant mica. The CRSA is interpreted as a channel fill deposit cut into the TGA, which is present in the same stratigraphic sequence beneath the Portland well field and to the north and south of PDX. The CRSA is estimated to be between 150 and 225 feet thick at PDX based on borings logs from PDX and the Portland well field.

2.6.2 Local hydrogeology

The depth to groundwater in wells completed in the Overbank Deposits and the CRSA generally ranges from 2 to 10 feet bgs, depending on location, seasonal influences, and long-term precipitation trends. The inferred groundwater flow direction in the Overbank Deposits is predominantly toward the west and northwest. The groundwater flow direction in the CRSA, indicated by data collected prior to the Phase II Remedial Investigation (RI), was primarily toward the northwest. Water level data collected during a Phase II RI conducted by ERM suggests that the groundwater flow direction in the CRSA fluctuates between northeast and south (ERM 2001). Groundwater elevation data collected by the BEM Team during this investigation were used to evaluate the groundwater potentiometric surface for the immediate area of the former incinerator area only and indicate that shallow groundwater flows generally in the southeast direction (**Section 5.3.4**).

1372 Oregon Air National Guard Base COMM
2015 - 2016

TAXI

DoD Component may need to conduct additional response actions

HAFLEY Dan

From: Saunders, Frances D CIV USAF NGB A4 (US) [frances.d.saunders.civ@mail.mil]
Sent: Monday, February 06, 2017 12:17 PM
To: HAFLEY Dan
Subject: RE: [Non-DoD Source] RE: NFA proposal for Portland ANG site
Attachments: Revised Site Management Procedures - Update to DERP Management (22 Aug 2016).pdf

Dan –

We would like to press ahead and close the Portland ANG sites.

If we discover PFOS/PFOA during the Site Investigation, then we would conduct a Remedial Investigation and follow DoD's Revised Site Management Procedures – Update to DoD Manual 4715.20 (attached). If the PFOS/PFOA is identified at a closed site(s), we would reopen the site(s) if it makes sense, or we would create a new site if PFOS/PFOA is discovered at a location not associated with an existing site.

Thanks,
v/r
Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil

From: HAFLEY Dan [mailto:dan.hafley@state.or.us]
Sent: Wednesday, February 01, 2017 12:52 PM
To: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>
Subject: [Non-DoD Source] RE: NFA proposal for Portland ANG site

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Fran –

As DEQ prepares to review the ERP closeout document for Portland ANG, thought has been given to how issuance of an NFA does or does not impact PFA investigation work scheduled to occur in 2017/2018. We are hesitant to go through public notice and comment and issue a final NFA for base "cleanup" work with the PFA issue outstanding.

Have you given this matter consideration, and do you have recommendations on how you would like to proceed?

DH

HAFLEY Dan

From: Saunders, Frances D CIV USAF NGB A4 (US) <france
Sent: Monday, September 11, 2017 12:54 PM
To: HAFLEY Dan
Subject: RE: PFOS/PFOA SI Kickoff Meeting at Portland

Thanks, Dan! ...Fran

FRANCES D. SAUNDERS
Restoration Program Manager
ANG Readiness Center, NGB/A4OR
3501 Fetchet Ave - Shepperd Hall
Joint Base Andrews MD 20762-5157
DSN: 612-9511 Comm: (240) 612-9511
frances.d.saunders.civ@mail.mil

-----Original Message-----
From: HAFLEY Dan [mailto:dan.hafley@state.or.us]
Sent: Monday, September 11, 2017 3:43 PM
To: Saunders, Frances D CIV USAF NGB A4 (US) <frances.d.saunders.civ@mail.mil>; Rein, Roger C Ci
<roger.c.rein.civ@mail.mil>; Stan.Jones@portofportland.com
Cc: Pinigis, Dennis J CIV USAF NGB A7 (US) <dennis.j.pinigis.civ@mail.mil>; dbarber@bbande.com;
'alex.d.shook@leidos.com' <alex.d.shook@leidos.com>
Subject: [Non-DoD Source] RE: PFOS/PFOA SI Kickoff Meeting at Portland

Fran -

Thank you for the update. Attached is the requested letter from DEQ supporting elimination of the PRL.
up to date on FUDS as things develop.

Beautiful day here; sorry about our weather last week. Nevertheless, it was a pleasure to meet you and yo

DH

-----Original Message-----
From: Saunders, Frances D CIV USAF NGB A4 (US) [mailto:frances.d.saunders.civ@mail.mil]
Sent: Monday, September 11, 2017 9:59 AM
To: Rein, Roger C CIV USAF 142 MSG (US) <roger.c.rein.civ@mail.mil>; HAFLEY Dan <dan.hafley@state.or.us>;
Stan.Jones@portofportland.com
Cc: Pinigis, Dennis J CIV USAF NGB A7 (US) <dennis.j.pinigis.civ@mail.mil>; dbarber@bbande.com
Subject: PFOS/PFOA SI Kickoff Meeting at Portland

Roger, Dan, and Stan -

Matt Vest (Leidos Project Manager) and Winston Crow (COR) both agreed that we can eliminate POL Storage - Bldg 4
as a PRL and replace it with Former Site 7 (Burn Pit) for the PFOS/PFOA SI at Portland.